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HEALTH CARE AND THE PUBLIC SECTOR

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ABSTRACT

This paper summarizes the many aspects of public policy for health care. I first consider government policy affecting individual behaviors. Government intervention to change individual actions such as smoking and drinking is frequently justified on externality grounds. External costs of smoking in particular are not very high relative to current taxes, however. More important quantitatively are the internal costs of smoking to the smoker. A recent literature has debated whether such internalities justify government action.

I then turn to markets for medical care and health insurance. Virtually all governments provide health insurance for some part of the population. Governments face several fundamental choices in this provision. The first choice is between operating the medical system publicly or contracting for care from private providers. The make-or-buy decision is difficult in medical care because medical quality is not fully observable. Thus, private sector efficiency may come at the expense of quality. A second choice is in the degree of cost sharing. More generous insurance reduces the utility cost of illness but also leads to overconsumption of care when sick. Optimal insurance balances the marginal costs of risk bearing and moral hazard. In the US, government policy has historically tilted towards more generous insurance, by excluding employer payments for health insurance from income taxation. The welfare loss from this subsidy has been a theme of much research. Finally, governments face issues of competition and selection. Sick people prefer more generous insurance than do healthy people. If insurers know who is sick and who is healthy, they will charge the sick more than the healthy. This differential pricing is a welfare loss, since it denies sick people the benefits of *ex ante* pooling of risk type. Even if insurers cannot separate sick from healthy, there are still losses: high costs of generous plans discourage people from enrolling in those plans. Generous plans also have incentives to reduce their generosity, to induce sick people to enroll elsewhere. Adverse selection is empirically very important. To date, public policies have not been able to offset it.

Finally, I turn to the distributional aspects of medical care. Longstanding norms support at least basic medical care for everyone in society. But the generosity of health programs for the poor runs up against the possibility of crowding out private insurance coverage. Analysis from Medicaid program expansions shows that crowdout does occur. Still, coverage expansions are worth the cost, given the health benefits they bring.

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Governments are involved in the medical sector in many ways. The most noticeable role of government is as a health insurer. In most developed countries, governments guarantee health insurance to the entire population. The United States is an outlier; governments insure some, but not all, of the population. Some governments also provide medical services. Medical care delivery is entirely public in some countries and even in the privately-dominated US, governments run 15 percent of the hospitals. The tax side of the ledger is also important. In the United States, the Federal government subsidizes employer-provided health insurance by excluding contributions for this insurance from taxable income. The amount of revenue foregone by this exclusion is nearly $60 billion in income taxes alone per year, or about 15 percent of direct government payments for medical care. In addition, governments tax goods with adverse health consequences, such as smoking and drinking, with the idea of improving health. Finally, governments regulate health care. Governments restrict insurance companies (what can be offered and to whom), license medical care providers, and approve new drugs and devices before they can be sold.

What role should the government have in health care? What is the empirical evidence about the efficacy of government interventions? Since health care is so central to the public sector, addressing these questions is a prime concern of public economics. I pursue these questions in stages.

Figure 1 shows a conceptual diagram underlying the public sector role in health care. Individual utility depends on health and other goods. Health, in turn, depends on many factors. Individual behaviors are important; behaviors influence health and also utility directly. The environment affects health, more so in the past when water and sanitation were serious health hazards than today, but even today environmental issues are important. Medical care is a third factor

influencing health. Medical care cannot be understood without analyzing the health insurance market, its subsidiary. Other factors noted in the figure might also influence health but are farther removed from the public sector, including genetics and socioeconomic status.[1] I thus focus on behavioral, environmental, and medical influences on health.

The simplest situation to analyze is the health-related behaviors that people engage in. The canonical individual cases here are smoking and drinking; both have benefits to the individual (direct consumption value), but adverse health consequences for the individual using them and possibly others. At the firm level, pollution has similar characteristics; it helps to produce goods and services that individuals want, but has byproducts that are harmful to health.

The classic economic rationale for government involvement in such activities is on externality grounds; people who smoke, drink, or pollute cause harm to others, and these costs should be internalized when people make their behavioral decisions. As we shall see, however, the situation is not so clear. Estimating the external costs of smoking and drinking is not so straightforward in part because smoking, and to a lesser extent drinking, is associated with some external benefits, as people pay taxes over their working life but die at a younger age. There is a spirited debate about whether these activities are on net costly or beneficial to society, and thus whether the optimal tax is high or low.

In addition to concerns about externalities, governments may also want to intervene to prevent people from worsening their own health. Rational people will take personal health harms into account when making behavioral decisions. But if consumption decisions are not rational,

[1] There is some literature claiming that in societies with more inequality in income, average health is lower (Wilkinson, 1996). Such claims are controversial, though (Deaton, 2001).

driven by impulse, fashion, or fad, taxes might be needed for 'internality' reasons. While it is difficult to know how much of these costs are accounted for in the individual consumption decision, the total internal costs of smoking and drinking dwarf the external costs, making this issue particularly salient. Economic research on the external and internal costs of health-related individual behaviors is summarized in Section II.

By far the largest government involvement in the health sector is in the market for medical care, and its derivative health insurance. Medical care markets are plagued by a host of potential problems, presented in section III: incomplete information on the part of patients; asymmetric information between consumers and producers about what patients really need; inability to tell whether services are justified, even *ex post*; externalities from consumption; moral hazard from insurance; adverse selection in insurance; and redistributive goals not met by the market. With such a litany of problems, it is no surprise that free markets for medical care function poorly.

These market failures sometimes lead governments to provide medical care directly. The choice between government and private provision of services is an important one, and countries differ on this decision. The central issue in this debate is whether public and private incentives are properly aligned. Government provision is generally believed to be less technically efficient than private provision, and medical care is no exception. But lack of a profit motive may be a virtue in some cases. When private providers would not act in the public interest, as for example a for-profit hospital that skimps on medical care because skimping is hard to detect, government provision may be superior to private sector provision. The empirical import of this argument is unknown. But such an analysis offers a lens through which to view institutional norms in the medical care field (the Hippocratic Oath; not-for-profit firms) that have traditionally worked to keep medical care quality high. These issues are explored in Section IV.

While governments are only sometimes involved in medical service provision, they are universally involved in health insurance provision. No developed country has an entirely private system of health insurance, even though many countries have (essentially) private medical care delivery systems.

In the case of one individual purchasing insurance, there is a classic economic tradeoff that governments must respect. Insurance smooth s the financial risk associated with medical costs.[2] Optimal insurance from a risk-bearing perspective involves no out-of-pocket spending. But insurance also creates moral hazard; people spend more when they have insurance than they would otherwise because the price of medical services is lower. As insurance increases in generosity, the marginal gain from risk bearing falls while the marginal loss from moral hazard rises. The optimal level of insurance is the point at which the marginal gain in reduced risk bearing from additional insurance just equals the marginal loss from additional moral hazard. For a government running a health insurance system, this is the rule it needs to know.

Even in a private health insurance system, this rule has significant import. In the United States, the tax treatment of health insurance distorts the tradeoff between risk sharing and moral hazard. Where out-of-pocket spending on medical care must be purchased with after-tax dollars, employer payments for health insurance are not counted as income for personal tax purposes and thus receive an implicit subsidy. This subsidy encourages the provision of overly generous insurance. This has been alleged to lead to too much moral hazard, with empirical estimates suggesting a welfare loss of up to 10 percent of medical spending. There is substantial uncertainty

[2] As discussed below, this is not technically right. The goal of insurance is to equalize the marginal utility of income in different states of nature. In many cases, this can be achieved by smoothing the financial costs of medical care, but not always.

about the true welfare loss, however, because the relevant elasticities are not all known, because this calculation does not account for the dynamics of technological innovation, and because the tax subsidy may offset other market failures such as adverse selection and crowding out of private insurance by other public programs. Section V examines this host of issues.

Traditional analysis of optimal insurance, including the welfare loss from the tax subsidy, has concentrated on the demand side of the medical care market, controlling utilization by making patients pay more for the services they receive. Insurance might also affect the supply side of the market, by changing what physicians and hospitals provide. Managed care in the United States, along with virtually all medical care systems in other countries, uses supply side measures to limit overall spending. Theoretical analysis suggests, and empirical evidence confirms that supply-side measures are a complement to demand-side measures, since physicians respond to payment incentives along with price. The optimal use of supply and demand side restrictions, and the implications of supply side measures for other government policies such as the tax exclusion of employment-based health insurance is explored in section VI.

If individuals are heterogeneous with respect to their underlying medical risk, even more problems arise. Individuals who are greater risk for medical care spending like more generous health insurance than those who are lower risk. If insurers know who is high risk and who is low risk, they can price policies accordingly. Individuals will be fully insured, but higher risk people will pay higher premiums. While this is efficient *ex post* (after risk types are known), it is a welfare loss *ex ante*. People would like to insure their risk type but do not get to do so.

In other settings, knowledge of individuals' risk type is limited or insurers are not allowed to use such information in pricing. This situation might appear better than the previous one, since insurers cannot segment risks on their own. But problems arise here as well. As people sort

themselves across plans, the sick will drive up the price of more generous plans, while the less generous plans remain much cheaper. This process, termed adverse selection, leads to three sources of welfare loss. First, the sick once again pay more for insurance than the healthy, leading to the same risk segmentation loss noted above. Second, marginal people are induced to enroll in less generous insurance plans, so that they can benefit from the lower insurance premiums that being with healthy people allows. Third, plans are encouraged to reduce the generosity of their benefits, to attract the healthy and repel the sick. Empirical evidence shows large distortions from adverse selection. In nearly every setting without a mandatory, universal insurance plan, the sick wind up paying more for insurance than the healthy.

A variety of public sector activities may address problems of risk segmentation and adverse selection, ranging from mandatory pooling in one plan (as is done in many countries), to restrictions on what private insurers can offer to individuals. To date, public policies to combat adverse selection short of having a single national insurance plan have been only marginally successful. Problems arising from heterogeneity and the impact of public policies in these situations are discussed in section VII.

The analysis of heterogeneity brings up a related topic: whether people should be allowed to supplement public insurance with private insurance. Were everyone homogeneous, a single public (or private) plan would be appropriate. When individuals are heterogeneous, however, supplementation may be a valuable option. The most controversial form of supplementation is allowing the wealthy to buy better care than the public system provides the rest of society. Some countries forbid this on egalitarian grounds; others allow it. Theoretically, this type of supplementation need not harm, and could help the poor, if the government saves enough off of the rich opting out to afford more care for the poor. I discuss this issue in Section VIII.

Finally, Sections IX and X turn to intragenerational and intergenerational distributional aspects of health and medical care policy. The goal of many governments is to ensure adequate quality of medical care to the poor. In universal health insurance systems, such goals are relatively easily met. When health insurance is not universal, special programs must be designed for the poor. The United States has a patchwork of such programs: Medicaid provides health insurance for the poor; public hospitals provide significant uncompensated care; and even private hospitals provide 'free care' to the uninsured. The design of health programs for the poor poses a classic economic tradeoff: more generous public coverage promotes health but may also induce people who would have bought private coverage to drop that coverage.

The health and insurance consequences of programs for the poor can be evaluated using a unique natural experiment: in the 1980s and 1990s, Medicaid eligibility was expanded to people with somewhat higher incomes and different family circumstances. I review the literature on whether the Medicaid expansions crowded out private insurance coverage, and whether they led to health improvements for the poor. Crowding out is a significant empirical issue. Estimates suggest that up to one-half of the increase in public coverage from Medicaid eligibility expansions is offset by reductions in private coverage. Even with this crowding out, however, some evidence suggests that the Medicaid spending is worth the cost. Because health is worth so much, even small improvements in health from additional insurance can justify its high cost.

Before starting the analysis it is important to note several background points. I focus on public sector health issues exclusively. This chapter is not a synthesis of health economics writ large. Readers interested in learning more about health economics as a whole should consult the recent two volume Handbook series on the topic (Culyer and Newhouse, 2000a,b).

I also focus to a large extent on the United States. This is in many ways inevitable; the data

with which to analyze medical care systems are better in the United States than in other countries. Conceptually, the United States also presents many interesting economic issues, since the range of institutions and observed outcomes is much greater.

Finally, I note the crucial distinction between *health* and *medical care*. Good health is what people want; medical care is a means to that end. I shall use the terms health and medical care precisely, with one exception: I shall write about health insurance and not medical care insurance. While the latter is technically more appropriate, the former is too ingrained in the literature for me to do otherwise.

Before turning to the analytic issues about the public sector role in health care, I start in the next section by providing more background on medical systems generally and the role of the public sector in those systems.

I. Medical Care and the Public Sector

The medical sector is a large part of most developed countries. The average country in the OECD[3] spent 8 percent of national income on medical care in 1995. The high was 14 percent (the United States); the low was 6 percent (Greece). Further, the medical sector is growing rapidly. Since 1929, the earliest year for which we have data, medical care in the United States has increased at a rate of 3.8 percent in real, per person terms. GDP growth, in comparison, has been only 1.7 percent, more than 2 percentage points lower. This differential is large in other countries as well.

[3] Throughout this section, I consider the 23 most developed countries in the OECD, omitting Turkey and newer members such as the Czech Republic, Hungary, Korea, Mexico, and Poland.

Medical spending in the average OECD country increased over 2 percentage points more rapidly than GDP growth between 1960 and 1995.

Governments pay for a significant share of medical expenses, as Figure 2 shows. In the United States, governments pay for nearly 50 percent of medical spending. This is the lowest in the OECD. The average share is 76 percent, and ranges as high as 93 percent (Luxembourg). Government wasn't always so important. In 1929, governments in the United States accounted for 14 percent of medical spending. As late as 1965, the government's share was only one-quarter.

By another metric, nearly 20 percent of Federal government spending in the United States is devoted to medical care, with a similar share for state and local governments.

Understanding what government does in the medical sector requires more detail about that sector. Figure 3 depicts the medical sector in a fundamental fashion, via the medical care triad. There are three actors in the medical care system, shown as the points on the triad: patients, providers, and insurers. Patients pay money to insurers, and sometimes directly to providers. Insurers pay for the bulk of medical services, and also set rules on when and where patients can seek care. Providers diagnose medical problems, recommend appropriate treatment, and provide those treatments.

Governments can be involved in the medical care system at several levels (Besley and Gouveia, 1994). Some countries have a largely private system of insurance and medical care delivery, with government having a predominantly regulatory role. The United States is an example of such a system, as table 1 shows. It is the only developed country without universal insurance coverage. Other countries, including Canada and Germany, have public insurance with predominantly private providers. Finally, some countries have public insurance and public ownership of medical care delivery. The United Kingdom is a leading example of this type of

country.

The history of the public sector in medical care is a movement towards increasing government involvement (Cutler and Johnson, 2001). The first government health insurance system was enacted by Bismarck in the 1880s; health insurance was created with Old Age Insurance to give people a stake in the survival of the state. The United Kingdom introduced a health insurance program for the poor early in the 20th century. But such programs were small because medical care could not do a lot. In the late 19th and early 20th centuries, effective medical treatments were rare and medical costs were not highly variable. Medical insurance became more valuable for reasons other than redistribution as spending became more variable.

It wasn't until after World War II that medical care insurance became a priority. The efficacy of penicillin was demonstrated around that time, and advances in surgery were made. With technological change came variability in medical spending; having access to the medical sector became more important. The post-World War II period saw a flowering of health insurance and provision systems (Cutler, 2001). The British set up the first truly national medical care system in 1946. The NHS provided insurance and delivered medical services. This was followed in subsequent decades by other European countries and Canada. Generally, the later the country established national insurance, the less the government became involved in medical care delivery and the more it took an insurance role.

The United States was relatively late to enact public insurance. Private insurance coverage grew steadily during and after World War II, but there was no significant public insurance until Medicare and Medicaid were created in the mid-1960s. And while the United States has tinkered with these systems continuously since then, there have been no major expansions in public insurance

since that point.[4]

Because so much research on health economics is conducted using US data, it is instructive to describe that system in more detail. Table 2 shows the sources of insurance coverage in the United States. There are two significant public programs for medical care. Medicare is the larger program, spending about $200 billion annually, or one-fifth of total medical care spending. Essentially everyone over age 65 is eligible for Medicare, along with the blind and disabled and people with end-stage kidney failure.[5] Medicare insures 14 percent of the population.

Most Medicare beneficiaries (about 85 percent) are in the traditional fee-for-service insurance plan. Beneficiaries in that plan have complete choice about which providers to see. But covered services are limited. Unlike essentially all private insurance policies, the traditional Medicare program does not cover outpatient prescription drugs. It also does not cover chronic need for long-term care services such as a nursing home or home health aid, although this is generally absent from private policies as well. In total, Medicare beneficiaries account for 37 percent of medical costs. This share is greater than Medicare's share of spending (about 20 percent of total costs), reflecting the relatively limited scope of Medicare covered services.

About 15 percent of Medicare beneficiaries are in managed care arrangements. Medicare pays managed care plans a fixed amount for each person they enroll. Because the payments traditionally did not account for adverse selection adequately, these payment were believed to exceed the cost of caring for Medicare beneficiaries. Medicare lost money when people enrolled

[4] The Medicaid expansions of the late 1980s and early 1990s, discussed in Section IX, were the most significant insurance expansions since then.

[5] Formally, eligibility is for workers or dependents of workers with 40 quarters of Social Security covered earnings. Only a few percent of the elderly are not eligible for Medicare. The disabled are on Medicaid until they qualify for Medicare.

in managed care (Sing, Brown, and Hill 1998). Medicare is now implementing a system to more accurately account for adverse selection in plan payments, as discussed in Section VII.

Medicaid is the other major public insurance program. Medicaid eligibility is more heterogeneous. Two-thirds of program enrollees are poor, non-elderly women and children. These beneficiaries were traditionally in fee-for-service policies but increasingly have been enrolled in managed care plans. The blind and disabled are another recipiency group, prior to Medicare eligibility. Medicare eligibles can receive Medicaid if they have low incomes, or if their medical spending makes them have low disposable income. For these "dual eligibles", Medicaid will pay for cost sharing required by Medicare and uncovered services such as prescription drugs and long-term care. Because the elderly and disabled are more expensive than women and children, program spending is distributed relatively equally between the non-elderly poor, the blind and disabled, and the elderly. Fourteen percent of people have Medicaid as their primary insurance policy; these people in total account for 8 percent of medical spending.[6]

Finally, there are other, small public programs, including services for veterans, Native Americans, and dependents of active duty military personnel. These insure 1 percent of people and account for 5 percent of total medical spending.

The vast bulk of the non-elderly population (90 percent of those with insurance) has insurance through employment; only 10 percent of private insurance is purchased individually. The reason for this predominance of employment-based insurance is the tax subsidy to employer-provided health insurance, discussed below. Private insurance spending accounts for nearly half of total medical spending.

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[6] People with both Medicare and Medicaid coverage are included in the Medicare row, since Medicare is their primary insurance policy.

Finally, about 12 percent of the population is uninsured.[7] Such people still receive care and account for about 4 percent of medical spending.[8] But uninsured people do not pay for all of their utilization. The average uninsured person pays for only 44 percent of the medical services he uses. Part of the rest is financed by other government programs (for example, the Veterans Administration system), while another part is financed indirectly, by providers marking up the bills to other payers and using the additional revenues to offset the losses of the uninsured.

II. Public Policy for Health-Related Behaviors

Individual and firm behaviors are a clear factor affecting health, both positively and negatively. Smoking and drinking reduce health, while exercise and vitamin consumption improve health. At the firm level, pollution and the work setting also affect health. I start the analytic analysis of government policy for health care by considering health-related behaviors. At first glance, the analysis of health-related goods is no different than the analysis of any other good. If people value consumption of cigarettes and are willing to pay the monetary and health consequences of their actions, public policy need not intervene in this decision. This analysis is incomplete for two reasons, however. First it ignores external effects – the harms these behaviors bring to others that the individual smoker or drinker does not take into account. Governments may want to tax or subsidize these activities to get people to account for these effects. Second, people may not make

[7] Different surveys give somewhat different estimates of the uninsured population. The most commonly used number is about 15 percent, from the Current Population Survey. The MEPS data in table 2 show slightly lower shares, but the difference is not important in this context.

[8] Out-of-pocket payments in total account for one-fifth of medical spending.

the right decisions about health-related activities on their own. This is particularly true for goods with an addictive component. I consider these two rationales for government intervention in turn.

II.1 External Consequences of Individual Actions

The simplest case to analyze is one where individuals make appropriate decisions for themselves but where there are external consequences to consumption of particular goods. I start with this analysis. For simplicity, I consider a good that individuals consume that has adverse health consequences, such as smoking. Firm decisions about production of goods that pollute are dealt with in a separate chapter in this separate chapter in this Handbook (Bovenberg and Goulder, 2001), so I do not consider the issue further here.[9]

Suppose there are two goods: X, the consumption of which affects only the individual involved; and S, a good with external consequences. Utility for any individual i depends on goods consumption (X_i and S_i) and health. Health is a function of both own consumption of S and consumption of S by everyone else, denoted S_{-i}: $H[S_i, S_{-i}]$. The dependence of person i's health on consumption of S by others is the first external effect. For simplicity, I assume that all consumption of S by other individuals has the same impact on health, although this needn't be the case (only nearby secondhand smoke is bothersome). Combining terms, utility can be represented as

(1) $U_i = U(X_i, S_i, H[S_i, S_{-i}])$.

For simplicity, I assume everyone has the same income, Y. Disposable income is income net of medical care costs. I denote insurance costs for each individual as $T(\Gamma_i S_i)/N$, where N is the total population size. T is alternatively taxes used to finance public health care, or private insurance

[9] The analysis is conceptually very similar, although the firm does not suffer health consequences, so only the financial externalities are relevant.

premiums. These common costs are the second external effect of consumption of S. Normalizing the price of X at 1 and denoting P_s as the price of good S, the budget constraint is

(2) $\quad Y - T(\Sigma_i S_i)/N = X_i + P_s S_i$

An optimizing individual will maximize equation (1) subject to equation (2), taking as given the consumption decisions of others and the tax burden. The solution to this problem is given by (omitting the i subscript):

(3) $$\frac{U_S + U_H H_S}{U_X} = P_S$$

The left hand side is the marginal rate of substitution between X and S. The numerator of equation (3) is the marginal benefit of additional consumption of S – the utility benefits of S plus the health (dis)utility. Scaling by the marginal utility of good X turns this into a monetary value. Individuals will trade off consumption of X and S until the marginal rate of substitution is equal to the ratio of prices.

A utilitarian social planner, in contrast, will maximize the sum of social welfare ($\Sigma_i U_i$), subject to the constraint that aggregate consumption must equal aggregate income. The solution to this equation is given by

(4) $$\frac{U_S + U_H H_S + \sum_{-i} U_H H_{S_{-i}}}{U_X} = P_S + \frac{T'}{N}$$

Equation (4) differs from equation (3) in two respects. First, the social planner takes account of the effects of S_i on other people's health in determining the social value of additional consumption of S by i. The term $\Sigma_{-i} U_H H_{S-i} / U_X$ is the dollar value of marginal (dis)utility to others

associated with S_i. For a good with adverse external health effects, this term is negative, and the social value of S_i is lower. The reverse is true if consumption of S_i increases the health of others. The second difference is the financial consequences of S_i. The full monetary cost of S_i is the sum of the out-of-pocket price (P_S) plus the additional increase in taxes required as a result of good S consumption ($T\mathbb{N}/N$). The utilitarian social planner will take this social cost into account.

For individuals to make the right decisions about S_i they must face the right prices. The free-market price, P_S, may be too high or too low, depending on whether good S has beneficial or adverse effects on the health and financial circumstances of others. The optimal tax rate on good S, termed the Pigouvian tax rate, is the rate that makes individuals internalize all of the external consequences of their actions. The optimal Pigouvian tax rate J is given by

$$(5) \qquad \tau = \frac{T'}{N} - \frac{\sum_{-i} U_H H_{S_{-i}}}{U_X}$$

Goods with adverse health consequences ($H_{S-i}<0$) or adverse financial consequences ($T\mathbb{N}>0$) will face positive taxes. Some goods may be subsidized.

Taxation is not the only possible solution to the externality problem. Governments could limit or ban entirely consumption of goods with adverse external effects, and mandate consumption of goods with positive external effects. The relative virtues of taxation versus regulation depend in large part on the specifics of the good being considered. Taxation is most appropriate for goods where consumption decisions are made by numerous heterogeneous individuals; smoking is a prime example. But not all goods with these characteristics are taxed. Substances such as cocaine and heroin are banned, even though their demand characteristics are similar. When consumers are homogeneous, or production externalities result from a limited number of producers, regulation may

be more appropriate.[10]

Historically, government action was much more important than taxation or subsidies in promoting health-improving behavior. Early in the 20th century, for example, the government cleaned the water supply and built sewers to improve population health, when it could alternatively have taxed dirty water or poor sanitation. In the case of these public health improvements, the gains were so large (Preston, 1996) that government action may have been the efficient solution.

II.2 Estimating External Consequences of Smoking and Drinking

There has been a spirited economic debate about the optimal Pigouvian taxes on smoking and to a lesser extent drinking.[11] The issue is particularly difficult because it is not even clear whether these goods have negative external costs. Although smokers use more medical services for smoking-related illnesses than non-smokers, they also die at younger ages. As a result, smokers pay into social programs such as Social Security and Medicare throughout their working lives, but collect much less in old age. This death benefit offsets some or all of the fiscal costs of smoking.

Table 3 summarizes the literature on the external costs of smoking and drinking. The start of any such analysis is defining internal and external costs. Damages that the smoker suffers as a result of smoking are clearly internal. But are damages to other household members from second-

[10] Taxation and regulation also differ in situations of uncertainty. Taxes allow quantities to vary in situations where demand shocks change the marginal value of the good, while regulation does not. Such variability may or may not be valuable, depending on the sensitivity of social damages to changes in consumption (Weitzman, 1974).

[11] See Chaloupka and Warner (2000) and Cook (2000) for discussions of the economics of smoking and drinking respectively.

hand smoke? What about damages to an unborn fetus from a pregnant woman smoking? There is no obvious answer here. The most common assumption is that the family is the unit of decision-making, so that consequences of smoking and drinking for other family members are internalized.[12]

One must then specify the external costs to consider. The most important financial costs are medical care payments financed by insurance (either public or private), and Social Security payments net of taxes paid in. Other more minor costs include life and disability insurance premia, and the costs of fires from smoking. Possible health consequences from second-hand smoke are more controversial. While the literature is clear that there are adverse health consequences for some conditions such as childhood respiratory illnesses, there is more uncertainty about more costly illnesses such as cancer and cardiovascular disease in adults.

The first complete analysis of the external costs of smoking and drinking was presented in Manning et al. (1989, 1991).[13] Consistent with the literature at the time, Manning et al. assumed no external costs from secondhand smoke. Thus, the only external costs they consider are financial. Manning et al. conclude that the external costs of smoking are modest, ranging from -$.91 to $.24 per pack with different discount rates. The high estimates of external costs are associated with high discount rates; at those rates, the external benefits of smokers dying young are minimized. With no or low discounting, the external costs of cigarette usage are negative.

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[12] One could assert that some effects outside of the family are internalized. If a person chooses to ride in a car with a friend who drives drunk and kills them both, the death of the passenger is counted as an external cost but is conceptually similar to a fully-informed decision to live with a smoker.

[13] The relation between smoking and Social Security payments was first noted by Shoven et al. (1989).

Current cigarette taxes are substantially greater than this amount.[14] Formal cigarette taxes at the Federal and state level average about $.75 per pack in the United States. The recent Master Settlement Agreement between the states and tobacco companies resulted in price increases of about $.45 per pack, effectively a further increase in taxes (Cutler et al., 2000, 2002).[15] Thus, by these estimates cigarette taxes are well above the optimal tax based on externalities alone. This conclusion has been refined by Viscusi (1995), with similar findings.

The conclusion that cigarettes are overtaxed has drawn several critiques. One critique is the omission of damages from second-hand smoke. Although the scientific evidence on the effect of secondhand smoke on illness is still sketchy, some estimates indicate very large effects on health (Environmental Protection Agency, 1992; Glantz and Parmley, 1995). Related to this issue is the assumption that the family is the unit of decision-making and not the individual. If the individual were the unit of analysis, external effects such as damages from secondhand smoke within the family and the increased probability of pregnant women having low birthweight infants would also enter into the analysis. Such effects can be very large. Viscusi (1995), for example, estimates that the external costs of secondhand smoke including lung cancer and heart disease may be $.10 or more per pack. Evans, Ringel, and Stech (1999) conclude that the external costs of smoking including maternal behavior are extremely high, ranging from $.42 to $.72 per pack. Current cigarette taxes are not unreasonable given these estimates.

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[14] Taxation is not the only government involvement in smoking. There is a long history of cigarette regulations, including bans on radio and television advertisements, minimum purchase and consumption ages, and restrictions on smoking in public places. On the other side are subsidies to tobacco farmers. Generally, the literature finds that non-price policies do affect consumption, although the effects are relatively modest (Chaloupka and Warner, 2000).

[15] And in some other countries, cigarette taxes are even greater.

The third, and more fundamental critique, has to do with the exclusion of internal costs. This analysis implicitly assumes that individuals know about and adequately incorporate all adverse health consequences to themselves. I return to this assumption below.

Estimates of the external costs of drinking are complicated by the fact that not all drinking is associated with adverse consequences. Most of the external costs of drinking result from substantial drinking at one time – generally defined as alcohol above 2 ounces per sitting. About 40 percent of alcohol consumed is believed to be above this level. If taxes change the share of heavy drinkers in comparison to light drinkers, it will also change the Pigouvian tax rate.

The bottom panel of table 3 shows the estimates of the external costs of drinking. Manning et al. estimated the external costs of alcohol at $1.19 per excess ounce of alcohol (in 1986 dollars). The most important external costs are from with motor vehicle fatalities resulting from drunk driving. Since these occur shortly after the drinking episode, the estimates of external costs are not very sensitive to the discount rate chosen.

Current alcohol taxes in the United States are below the optimal tax rates shown in Table 3. Federal, state and local taxes are about $.27 cents per ounce for spirits, $.13 cents per ounce for beer, and $.12 per ounce for wine. Thus, the Manning et al. estimates suggest that alcohol tax rates should be substantially increased if they are designed to offset Pigouvian externalities.

Other studies have refined, but not substantially changed, this analysis. Pogue and Sgontz (1989) note that alcohol taxes involve a deadweight loss for light and moderate drinkers, who currently face higher taxes than is optimal (since the costs of light and moderate drinking are low). Pogue and Sgontz and Kenkel (1996) both conclude that even taking this into account, current taxes are well below the optimal tax.

There are a range of other goods that could be analyzed in a similar fashion, but have not

been. Gun ownership, for example, imposes substantial external costs, but there are no estimates of external costs in the literature. Extending this analysis to other goods is a clear research priority.

II.3 Internal Costs and Rational Addiction

Perhaps the most important economic issue in the analysis of individuals behaviors is the question of whether individuals correctly account for the adverse effects of such behavior on their own health. If individuals do not, the case for corrective government action is even stronger. Consider just the case of smoking. Smokers on average die about 6 years younger than non-smokers, a loss of roughly 2 hours per pack of cigarettes. Consensus estimates in the literature value a year of life at about $100,000 per year (Viscusi, 1993; Tolley et al., 1994; Cutler and Richardson, 1997). [16] Thus, the cost to a smoker from early mortality alone (ignoring morbidity or out-of-pocket medical expenses and not discounting) is about $22 per pack. Such costs dwarf the external costs presented above.

For most goods, economists are willing to assume that individuals correctly internalize these costs. After all, if a person were buying a good he did not value, he could simply stop buying the good. In the case of smoking and drinking, however, the situation is more complicated. Such goods are addictive, and it is not as easy to end consumption of an addictive good as it is for non-addictive goods.

Addictiveness by itself does not mean that consumption is inefficient. Becker and Murphy (1988) and Becker, Grossman, and Murphy (1994) present a theoretical model of rational addiction,

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[16] This estimate may not apply to specific years at older ages. In general, not much work has examined how willingness to pay estimates differ by age, although Krupnick et al. (2000) generally find similar willingness to pay estimates for the old.

showing that individuals may rationally decide to consume goods that are bad for them, if the current and future consumption benefits are sufficiently high. The idea is straightforward: rational smokers know that utility in the future depends on smoking decisions today, and factor in future utility costs and benefits when they decide how much to smoke today. People who do this correctly will not be helped by government intervention, other than providing information about true health risks. This is in contrast to the pure myopic model of addiction, where individuals make consumption decisions today without thinking about their future consequences. Government policy can help such myopic individuals to account for the future consequences of their current actions.

Testing the rational addiction model empirically is not easy, since the interesting alternative hypothesis is not the myopic model, but instead a model of addiction in which consumption is forward-looking but less than perfectly so. Most empirical analysis has focused on a test of forward looking behavior itself: does higher anticipated price lower current consumption? In a rational model, it would; if people know that future prices will be higher, they will value current consumption less, since part of the benefit of current consumption is that it increases the marginal utility of consumption in the future. When future prices are higher, the value of that future consumption is lower. In a myopic model, future prices are not associated with current consumption.[17]

Becker, Grossman, and Murphy (1994) were the first to test this prediction empirically. Their test involves regressing current cigarette consumption on past consumption, current prices of cigarettes, and future cigarette consumption. They instrument for past and future consumption with

[17] A different type of test is whether smokers accurately perceive the health costs of their smoking decision. Viscusi (1994) argues that smokers, if anything, overstate the health consequences of smoking. Schoenbaum (1997) suggests this is not true for heavy smokers.

past and future prices. The key test is whether future prices influence current consumption, via the effect on future consumption, controlling for current prices. The data are at the state-level from 1955 to 1985. Becker, Grossman, and Murphy find evidence for the rational model: higher future prices are associated with lower current consumption, controlling for current prices and past consumption. These results have been extended and applied to other addictive behaviors by Chaloupka (1991), Sung, Hu, and Keeler (1994), Waters and Sloan (1995), Olekalns and Bardsley (1996), and Grossman, Chaoupka, and Sirtalan (1998).[18]

But such results do not rule out all other models. Showalter (1999) argues that the relation between future prices and current consumption may be a function of rational firm behavior, not rational individual behavior. Rational firms will recognize that current smoking affects the future value of smoking and thus price accordingly.

More fundamentally, the Becker, Grossman, and Murphy results show only that the pure myopic model is wrong, not that smokers are fully rational. Several papers have argued that smoking is only incompletely rational. Laux (2000) argues that the discount rate implied by the Becker, Grossman, and Murphy analysis is too high; individuals appear to discount the future more at rates substantially higher than current interest rates. Gruber and Koszegi (2001) show that this result is consistent with a model where individuals are forward looking but have preferences that are not time consistent, as in Laibson (1997): people use high discount rates between periods in the near future and lower discount rates between periods in the more distant future. For example, if a rational consumer has a utility function given by $U = \sum_{t=0}^{T} \delta^t U_t$, a hyperbolic discounter would have

[18] The robustness of this methodology has been called into question, but an alternative methodology distinguishing anticipated from unanticipated price changes reaches similar conclusions (Gruber and Koszegi, 2001).

utility $U = U_0 + \$ G^{T}_{t=1} *^{t} U_t$. The parameter $\$$ reflects the overall discounting of the future compared to the present; for near future versus far future events, discounting is as in the standard model.

With hyperbolic discounting, individuals are forward looking in their smoking decisions but outcomes are still inefficient. People would prefer, on the basis of lifetime utility, not to smoke, but in each year they are not able to refrain from smoking. The desire to quit is a distinguishing feature of cigarette consumption.

In addition, most of the empirical analysis has focused on whether people rationally decide to continue or discontinue smoking given that they are already smoking. But if people do not rationally make the initial smoking decision, these later decisions begin from an inefficient outcome. Since most people start smoking as youths (42 percent of smokers start before age 16 and 75 percent begin before age 19), it is not obvious that initial smoking decisions are made with full information. Indeed, most smokers begin smoking below conventional ages of full maturity.

While non-smokers do not necessarily know if they will become addicted, this by itself does not imply that such decisions are inefficient. Orphanides and Zervos (1995) present a model where adolescents sample cigarettes but are uncertain about whether they will become addicted. If adolescents have unbiased knowledge about the true share of people who will become addicted, the adolescent decision is still rational. In practice, there is evidence that youths are overly optimistic about their ability to subsequently quit cigarettes. In a study of high school seniors, 56 percent said they would not be smoking in five years, but only 31 percent had quit by that time (U.S. Department of Health and Human Services, 1994).

Individuals may in some cases take account of their self control problems. If individuals know they have hyperbolic preferences, for example, they will look for ways to bind their future

actions in a favorable way. For example, people might commit to give away a certain amount of money if they do not stop smoking or commit to enter smoking treatment centers in the future. If such commitment devices are effective, they can solve the time consistency problem.

In the absence of such pre-commitment devices, however, government intervention will be appropriate, including taxation or regulation. The goals of government intervention are not so obvious, however. If one's current self wants to smoke but one's future self would prefer that one not, which self should the government favor in making policy decisions?

Overall, the optimal role of government for health-related goods with internal costs is unknown. In light of the potentially large welfare consequences associated with this issue, however, (internal costs up to 100 times greater than external costs considering mortality effects alone) further theoretical and empirical work on understanding these issues is extremely important.

III. The Market for Medical Care Services

Once sick, an individual's health depends to a significant extent on the medical care he receives. Public intervention in medical care is pervasive, for good reason. I lay out in this section why that is the case, and analyze particular aspects of public intervention in subsequent sections.[19]

Information problems. A first problem with medical care is the nature of information. People do not know the complexities of medical care diagnosis or treatment. This is common of

[19] Arrow (1963) was the first to highlight the conglomeration of difficulties in the medical care marketplace and much of the subsequent literature draws from that analysis.

many goods.[20] But in the medical care case, people often do not have enough time to learn this information before consumption decisions must be made. In other settings, there is usually more time.

This information asymmetry gives physicians market power. Physicians recommend to people what services are appropriate and often provide those services after they are recommended. Physicians also have leeway in pricing, at a time when consumers have little ability to price shop. Unless physicians have objective functions looking out for patient welfare, inefficient outcomes will result.

Further, determining the quality of services is difficult, even *ex post*. Medical care is a credence good – a good where the quality of the service is often not learned even after it has been provided (Tirole, 1988; Darby and Karni, 1973). If a patient had a bypass surgery operation, was it truly necessary? Not all doctors would agree. If there were post-operative complications, were they the fault of the surgeon, or simply a result of the patient's underlying sickness? Again, there is room for disagreement.

Since quality is so hard to measure, competitive markets will not necessarily work to improve quality. A surgeon wishing to improve his bypass surgery mortality rate could work on his surgical technique or could simply avoid performing surgery on patients with a high mortality risk. The latter step is easier and may have a larger impact on observed death rates. It will also be inefficient, if the patients at high mortality risk are those who need surgery the most. Perceptions that medical care may be provided inefficiently have been a factor contributing to public involvement in medical care systems.

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[20] Perhaps the closest analogy is automobile repair. See Triplett (2001).

Externalities. Some medical care has external effects. A person who is not vaccinated for a communicable disease is at risk of infecting others. Similarly, a person who uses antibiotics but stops in mid-course contributes to the development of antibiotic-resistant bacteria. These types of externalities are conceptually identical to the externalities associated with smoking and drinking. Thus, they are not considered further.

Insurance and moral hazard. Medical care demand is unpredictable. Healthy people do not need much medical care; sick people need substantial amounts. This large uncertainty about demand is the central rationale for health insurance. Full insurance eliminates the risk associated with uncertain medical expenses by having the insurer pay for the full cost of all treatments. But such insurance creates its own problems, the most important of which is *moral hazard*[21] – the phenomenon where an individual uses more services because he is insured than he would choose to do if he could contract for services before he knew what diseases he would have (Arrow, 1965; Pauly, 1968, 1974; Zeckhauser, 1970; Spence and Zeckhauser, 1971; Kotowitz, 1987). Insurance must balance this moral hazard against the gains from improved risk sharing.

Heterogeneity, risk segmentation, and adverse selection. In a population of individuals whose underlying health risks are heterogeneous, more and less healthy people will demand different insurance policies. Sicker people generally want more extensive health insurance than healthier people. This differential demand creates problems for the efficient provision of health

[21] There are other problems as well, but these work in the same direction. For example, administrative cost considerations argue for excluding small bills from coverage but paying for larger bills. This is similar to the optimal insurance policy with moral hazard.

insurance. If insurers can segment sick from healthy, all people will be insured but at different prices. If they cannot, people will have incentives to *pretend they are* healthier than they truly are, a factor termed *adverse selection*. In either case, there are problems with market equilibria: people pay different amounts for insurance when they would have chosen to pool together *ex ante*; the allocation of people across plans may be inefficient; and plans may skimp on quality to attract the healthy and repel the sick. For all of these reasons, the government may want to be involved.

Equity. Access to medical care is commonly viewed as a right, not a good in the sense of luxury cars or expensive houses. People are unhappy when poor people are not able to get necessary medical care. One might justify this concern for the poor on a public health argument; if one person has a communicable disease and does not get treated, others are at risk as well. But this characterizes only a small share of disease in a developed country. There is a fiscal externality argument as well; when people are healthy, they earn more and pay more in taxes. But the argument for redistribution is really much more basic. Medical care, along with food and shelter, is a good that society feels everyone should have access to.

This fact has enormous implications for public policy. Because medical care is so expensive, the poor cannot be made to pay for it on their own. Thus, government intervention is necessary to pay for the medical care of the poor. Designing such an income transfer system is a central public economics question. In part, this is an optimal income tax problem of the type considered in the chapter by Auerbach and Hines (2001). But there is a twist: some of the poor will have insurance prior to the public subsidy. Thus, in addition to labor supply and savings issues that result from redistribution, there is also the problem of 'crowding out', where an increased government subsidy encourages more people to join the public program. Crowding out makes the value of public

insurance expansions difficult to determine *ex ante*.

IV. Government Versus Private Provision

Given the information problems noted above, it is not obvious that doctor-patient interactions in an unregulated market will lead to efficient outcomes. Profit-maximizing physicians may skimp on care when such skimping cannot be detected. They may provide more care than is appropriate if they are paid more for doing so and patients do not know such care is unnecessary. And prices may be above marginal cost because patients cannot easily shop for providers.

Governments thus face a fundamental decision in the medical sector; should medical services be provided privately, or should the government provide medical services itself? Countries have made very different decisions about this issue. In the United Kingdom, hospitals at least historically were run by governments. Governments set staffing levels, determined technology allocation, and decided on appropriate investments. In the United States, in contrast, providers are mostly private. Most hospitals are not-for-profit organizations, and physicians are independent practitioners working (at least historically) on a fee-for-service basis. The government has a large say in how providers are paid and what technology investments are made, but it does not control day-to-day resource decisions. Other countries are in the middle.

Countries also change systems over time. The United Kingdom has introduced some market forces into the medical sector. General practitioners 'fundholders' can now bargain for rates among different hospitals and send patients to the hospital of their choosing. Many hospitals are not-for-profit trusts. In the United States, there have been substantial conversions of hospitals between government, private not-for-profit, and for-profit organizational form over time (Cutler and Horwitz,

1999).

The make or buy decision in health care has been a subject of debate for decades (see Propper and Green, forthcoming, for discussion of health care, and Shleifer, 1998, and Poterba, 1996, for a more general discussion). The traditional debate pitted arguments of monopoly and monopsony on the one side, and innovation on the other. Government intervention was justified because of monopoly power of physicians and the information problems noted above. By controlling medical provision, it was believed that the government could use its monopsony power to purchase such services at a low price. The counter-argument focused on incentives for efficiency. Without market incentives, it was feared that government production would be technologically inefficient and innovation would be stifled.

Empirically countries where the public sector runs the medical system spend less on medical care than countries with private providers. In OECD countries, for example, the correlation between the public sector share of financing and the share of GDP devoted to medical care is -0.41. More formal analysis controlling for additional variables also finds this conclusion (Globerman and Vining, 1998). There is also evidence for the inefficiency view. People in many European countries are disenchanted with the quality of medical care, and these countries have struggled to increase the efficiency of the medical care system in recent years (Cutler, 2001).

A recent literature emphasizing the role of public sector contracting has expanded the dimension of this analysis, considering issues of allocational as well as technical efficiency (Hart, Shleifer, and Vishny, 1997; Shleifer, 1998). Consider the question of whether a government should provide hospital services itself or contract with a for-profit hospital company to provide the services. For-profit companies will respond to financial incentives more rapidly than government-run companies, since for-profit managers receive more of the payoff from responding to these

incentives. Thus, contracting to a for-profit provider will be preferred *if* the incentives that the firm faces are the correct ones. If the incentives are not correct, however, having more responsive for-profit firms may lead to poor outcomes, and providing the service in house might be preferred.

Suppose, for example, that hospitals can skimp on quality without being detected. For-profit hospitals will skimp more than government-run hospitals, since the for-profit firm benefits financially from such skimping. If skimping results in substantial welfare loss, government provision would be preferable to contracting out, even though the for-profit firm may be more technically efficient. In contrast, if the government can write a contract that appropriately incentivizes the for-profit firm or penalizes the firm for skimping on quality, contracting out would be superior to in-house provision. Neither in-house production nor contracting out is necessarily preferred. It depends on the contracts the government can write, and the regulatory and monitoring ability of the government.

Taking this analysis further, one can think about social institutions in the medical care field as a form of quasi-government institution designed to counteract the adverse incentives that pure profit-maximization would lead to.[22] Two such institutions are important. First, doctors have an ethic to earn the trust of their patients. This is codified in the Hippocratic Oath of promoting the best medical outcomes for patients. Second, not-for-profit firms dominate the medical sector. Two-thirds of hospitals in the United States are private not-for-profits, many of them associated with religious institutions. By renouncing the ability to turn profits into personal gain, not-for-profit hospitals commit themselves to less strict incentives for profit-maximization (Glaeser and Shleifer, 2001; Hubbard and Hassett, 2000). Each of these institutions may help to counteract the adverse

[22] Arrow (1963) was the first to make this argument.

results that profit maximization with poor information and distorted incentives might produce.

The relative performance of different organizational forms within a system, or different levels of public and private ownership across systems, is ultimately an empirical question. Substantial recent literature has explored this question. In the United States, comparisons of the quality of medical care between for-profit, private not-for-profit, and government hospitals generally suggest that quality is about the same in different organizational forms (see Sloan, 2000, for a review).[23] But there is substantial heterogeneity in quality within each organizational type, the source of which is not readily apparent.

Quality of care comparisons at the level of particular institutions are of limited value, however, because different organizational forms will influence each other in the marketplace. Hansmann (1980) argued that quality at for-profit hospitals was kept high because their not-for-profit competitors provided high quality, making deviations from quality by for-profit hospitals more readily detectible. On the other hand, Cutler and Horwitz (1999) and Silverman and Skinner (2000) argue for an 'inverse-Hansmann effect', where for-profit hospitals lead not-for-profit hospitals to change their behavior in socially-adverse ways.

Thus, a more relevant question may be whether quality differs across markets with different overall levels of organizational form: predominantly public, predominantly private not-for-profit, or predominantly private for-profit. Such analyses might be conducted in the United States, or across countries. Research along these lines has not progressed as rapidly as research at the institutional level. It is clear that medical care quality differs substantially across areas; what is less

[23] The organizations may differ along other lines, though. Duggan (2000) shows that for-profit and private not-for-profit hospitals respond similarly to incentives to cream-skim the healthiest patients, while government hospitals are less responsive.

clear is why (Fisher, Skinner and Wennberg, 1998). Examining how quality relates to overall organizational form is an important research priority.

V. Moral Hazard and the Tax Subsidy to Insurance

Medical spending is extremely variable, as Table 4 shows. In any year, the top 1 percent of medical care users consume about 30 percent of all medical care services, and the top 10 percent use about 70 percent of resources. Much of this differential use is uncertain; people may know they are at risk of a serious disease, but rarely do they know the exact amount of their future spending.

This uncertainty about medical care needs drives the demand for health insurance. Health insurance redistributes money from when people are healthy to when they are sick, alleviating the financial cost associated with illness and allowing people to afford medical services they would otherwise not be able to afford. But health insurance creates problems of its own. In particular, by making it easier for people to get medical care when sick, it encourages people to use too much care. The use of excessive medical services because people are insured is termed moral hazard. In this section, I discuss the tradeoff between risk bearing and moral hazard.

V.1 Optimal insurance with fixed spending

To see the value of insurance most clearly, consider a one-period model where initially identical individuals are either healthy or sick. People are sick with probability p; if they get sick, they need a fixed amount of medical care, m, after which they are restored to perfect health.[24]

[24] I assume m is affordable given y, and that the person will always want to pay for the medical care if sick. If medical care does not restore a person to perfect health, the situation is a

People are healthy with probability 1-p, in which case they require no medical care.

Individual utility, U, depends on non-medical consumption. If individuals have income Y,[25] consumption in the absence of insurance is Y if the person is healthy and Y-m if the person is sick. Expected utility is therefore:

(6) $V_N = (1-p)\,U(Y) + p\,U(Y-m)$,

where the subscript N denotes being uninsured. I assume that U(.) has the standard concavity properties: $U' > 0$ and $U'' < 0$.

Actuarially fair insurance will pay for the individual's medical care when sick, financed by a constant premium. The fair premium, B, is equal to expected spending, or pm. People who are insured will always have consumption $Y-B$, so utility will be:

(7) $V_I = U(Y-B)$.

Using a Taylor series expansion of equation (6),[26] we can approximate that equation as:

(8) $V_N \approx U(y-B) + U'(U''/2U')\,B(m-B)$.

Therefore, the value of full insurance is

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bit more complicated. The individual will want to redistribute income to the point where marginal utility is the same in sick and healthy states. If marginal utility is higher when sick than when healthy (for example, because of the need to pay for help around the home or other assistive devices), then optimal insurance will transfer more than m when sick. If the reverse is true (for example, if people value vacations more when healthy than when sick), insurance will transfer less than m when sick. See Cutler and Zeckhauser (2000) for more discussion.

[25] Assume, for simplicity, that this income endowment is fixed, and that individuals can neither borrow or lend.

[26] The Taylor series is taken about the level of income net of insurance premiums. From equation (6), $V_N \approx (1-p)\,[U(y-B) + U'B + \tfrac{1}{2}\,U''B^2] + p\,[U(y-B) - U'(m-B) + \tfrac{1}{2}\,U''(m-B)^2]$. Collecting terms, this simplifies to $V_N \approx U(y-B) + U'\{(1-p)B - p(m-B)\} + \tfrac{1}{2}\,U''\{(1-p)B^2 + p(m-B)^2\}$. The term $(1-p)B - p(m-B)$ is zero. The term $(1-p)B^2 + p(m-B)^2$ can be expanded as $(1-p)B^2 + pm^2 - 2pmB + pB^2$. Since $pm = B$, this simplifies to $pm^2 - B^2 = B(m-B)$.

(9) Value of Insurance = $(V_I - V_N) / U_N \cdot (1/2)(-U_0/U_N)\beta(m-\beta)$.

The left hand side of equation (9) is the difference in utility from being insured relative to being uninsured, scaled by marginal utility to turn it into a dollar value. The right hand side is the benefit of risk removal. Here, $(-U_0/U_N)$ is the *coefficient of absolute risk aversion*; it is the degree to which uncertainty about marginal utility makes a person worse off. Because utility is concave, this term is positive. The term $\beta(m-\beta)$ represents the extent to which after-medical expenditure income varies because the person does not have insurance. It too is positive. The product of terms on the right hand side of equation (9), therefore, is necessarily positive, implying that actuarially fair insurance is preferred to being uninsured. The dollar value of risk spreading increases with risk aversion and with the variability of medical spending.

This point is shown graphically in figure 4. Consumption when healthy and sick are shown on the horizontal and vertical axes. The endowment point is E. Fair insurance takes money from people when they are healthy and gives them money when they are sick. The downward sloping line reflects this fair insurance.[27] If insurers break even, individuals can trade off income in the two states at actuarially fair rates.

The first-best equilibrium is full insurance. The intuition supporting this result is that risk averse individuals would like to smooth the marginal utility of income — to transfer income from states of the world where their marginal utility is low (healthy state) to states of the world when their marginal utility is high (sick state). In the absence of insurance, a person's marginal utility of income when healthy is $U_N(Y)$ is below that when sick, $U_N(Y-m)$. Transferring income from healthy

[27] With fair insurance, premiums when healthy equal payments when sick. A $1 premium when healthy can therefore pay the individual s when sick, where $-(1-p) = ps$. The slope of the fair odds line is therefore $s = -(1-p)/p$.

states to sick states until marginal utility is equalized maximizes total expected utility. Health insurance carries out this transfer.

The form of insurance imagined by this policy is indemnity insurance. Indemnity insurance is a fixed payment made to an individual or provider depending on the diagnosis of the individual. The simplest indemnity policy, first offered by private insurers, reimbursed people a fixed amount per day they were in the hospital (for example, $5 per day). Such policies were common in the United States as recently as the 1960s. More sophisticated indemnity insurance policies might condition payment on the diagnosis of the individual, for example $5,000 payment if a person has pneumonia and $15,000 if the person has cancer.

Indemnity policies are closely related to their precursor, a pre-payment policy. In this policy, a person pays a doctor a fixed amount of money each year, with the doctor agreeing to care for the person whenever he is sick. The first Blue Cross/Blue Shield policies were like this. Blue Cross, and later Blue Shield, plans were sponsored by providers. In exchange for fixed monthly payments, people were guaranteed a certain number of days in the hospital if they were needed (Blue Cross) and physician services (Blue Shield).

Indemnity insurance is optimal if medical costs conditional on a disease are known (Zeckhauser, 1970). Prepayment is optimal if the providers one wants to use are all part of the plan and the providers can bear the payment risk that is required of them. But neither of these conditions is necessarily true. If there is variability in disease severity within indemnity groups which cannot be contracted on – for example variation in the particular intervention needed or in recovery time – a fixed indemnity payment still exposes the individual to substantial risk. Exposure to this risk involves a welfare loss. As medical technology has become more complex and optimal treatments have become more differentiated, the ability to adequately design such policies has declined.

Thus, in practice health insurance has moved to a third model, a service benefit policy.[28] Such a policy pays for a percentage of the actual costs of treatment. Service benefit policies are characterized by three features, shown in figure 5: a deductible (the first amount that a patient pays before receiving any reimbursement); a coinsurance rate (the share of costs the patient pays above the deductible); and a stop-loss (the maximum amount the patient can pay). In the United States, private service benefit policies generally have a family deductible of about $500 (roughly $200 for an individual), a coinsurance rate of 20 percent, and a stop-loss of $1,500 to $2,000 (Kaiser Family Foundation and Health Research and Educational Trust, 2000). The Medicare program has much higher cost sharing. Inpatient care has an $800 deductible per episode. Outpatient care has a $100 annual deductible and 20 percent coinsurance rate, with no stop loss.

Service benefit policies insure a greater share of risk than do indemnity policies. The central problem created by service benefit insurance is moral hazard. By lowering the cost of medical care at the time of use, the service benefit policy encourages excessive use of services. This limits the optimal degree of insurance coverage, as I now show.

V.2 Optimal insurance with moral hazard

To illustrate the impact of moral hazard, I modify the model presented above. Suppose that rather than being healthy or sick, the individual has a range of potential illness severities, s, with s distributed with density function f(s). Health is given by H=H[s,m]. The patient's s will determine the optimal treatment. A simple way to depict uncertainty about optimal care is to assume that the

[28] Unfortunately, the service benefit policy is typically called indemnity insurance (and contrasted with managed care insurance) in the literature. I retain the terminology of service benefit to contrast it with true indemnity insurance.

insurer does not know the patient's s, and hence cannot make an optimal indemnity payment.

Before deriving the optimal policy in this situation, it is useful to consider the optimal policy with full information, and thus no moral hazard. With full information, the coinsurance rate can be conditioned directly on s. The individual will therefore choose m(s) to maximize feasible utility:

(10) $\text{Max}_{m(s)} \int U(y-B-c(s), H[s,m])\, f(s)\, ds,$

where the first term is non-medical consumption and the second term is health. B is the insurance premium and is equal to

(11) $B = \int (m(s)-c(s))\, f(s)\, ds.$

An atomistic consumer takes the insurance premium as fixed when making medical care consumption decisions. The solution to this problem therefore sets:[29]

(12) $H_m U_H = E[U_x],$

where $x = Y-B-c(s)$. The left hand side of equation (12) is the marginal gain in utility from spending another dollar on medical care, the product of the marginal effect of medical care on health and the marginal effect of health on utility. This marginal gain will be the same in each state of nature. This is equated with weighted average expectation of the marginal utility of consumption in different illness states, namely:

(13) $E[U_x] = \int U_x(y-B-c(s), H[s,m])\, f(s)\, ds.$

Equation (12) says that with the optimal first-best policy, the expected marginal utility gained from an additional dollar of medical care in each state of the world equals the utility cost of that dollar.

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[29] This assumes that these functions are well behaved, hence that local optima are global optima. Some medical expenditures may offer increasing returns over a relevant range. For example, it may cost $200,000 to do a heart transplant, with $100,000 accomplishing much less than half as much. Efficiency then requires the insurance program spend at least to the minimum average cost of benefits point, or not at all.

In the case where the marginal utility of income does not depend on the health state,[30] imposing a coinsurance payment in any health state – eg, a variable c(s) – increases the variability of income and thus reduces expected utility. The optimal policy for this commonly studied case is thus no coinsurance, and an indemnity payment m*(s) that fully reimburses optimal spending in each state.

Now consider the case where the insurer cannot observe s, only m. Therefore, the insurer must implement a cost-sharing rule depending on m, c(m).

The sick consumer will choose medical care utilization $m^{\#}(s)$ to maximize utility given this cost sharing requirement and his knowledge of s. The consumer's problem is formally:

(14) $\text{Max}_{m(s)}\ U(Y-B-c(m), H[s,m])$ œ s.

The solution to this problem, for each s, is given by the first order condition:

(15) $H_m U_H = c'(m)\ U_x$ œ s

The left-hand side once again represents the gain in utility from spending another dollar on medical care, which is equated to the utility cost to the individual from spending that dollar.

Taking expectations of equations (12) and (15) shows the welfare loss from moral hazard. There are two losses. First, the expected marginal gain from foregoing medical spending in the situation with moral hazard, $E[c'(m)\ U_x]$ is below the equivalent expectation in the situation without moral hazard, $E[U_x]$. Because people face a lower price for medical care, they will consume more resources in every state of nature where the coinsurance rate is below 1.

Moral hazard can take two forms. *Ex ante* moral hazard refers to the possibility that people may not take as good care of themselves if they are insured, since they know that health insurance

[30] This would be the case if utility were separable in income and health.

will pay for their care if they do get sick. *Ex post* moral hazard refers to people using more services when they are sick than they would have used if they could perfectly commit to service use before they become sick. *Ex post* moral hazard is likely more important in the medical care context than *ex ante* moral hazard, since the uncompensated losses of not taking care of oneself in the first place (possible death and disability) are so large. But *ex ante* moral hazard is present to some extent; cigarette consumption, for example, would certainly fall if people faced the full cost of smoking in higher out-of-pocket medical payments.

In addition, there are losses from the variability in the marginal utility of income across states of nature. If the coinsurance rate varies with medical spending, the marginal rate of substitution between health and other goods will vary as well. When coinsurance rates are lower, even more is spent on medical care and the marginal rate of substitution between health and other goods falls. Smoothing the marginal rate of substitution across states of nature would improve welfare.

Not all of the demand response to having insurance is moral hazard. The thought experiment is whether the individual would pay for the medical expenditure in expectation, before he knew his condition, not *ex post*, given his income while sick. Suppose that bypass surgery optimally costs $50,000. Before a person knows if he will have a heart attack, he might agree to pool economy-wide the $50,000 cost for people who have a heart attack. Now suppose that *ex post* two people have a heart attack: one with insurance and one without. The person without insurance finds the bypass surgery too expensive and does not receive it. The person with insurance has the operation, and because he is insured uses $60,000 of medical care. The moral hazard here is the $10,000 of use above the optimal amount, not the $60,000 of total spending difference between the insured and uninsured person. In other words, moral hazard is the *substitution effect* of people spending more

on medical care when its price is low, not the *income effect* of people spending more on medical care because income has been transferred to when they are sick (de Meza, 1983; Nyman, 1999).

In insurer recognizing moral hazard will design a policy with that in mind. Denoting $m^{\#}$ as the optimal amount of medical care for the consumer to receive, the solution to equation (15), the insurer's problem is to the cost sharing rule $c^*(m^{\#})$, to maximize expected utility:

(16) $E[U^*] = Max_{c(m\#)} \int U(Y-B-c^*(m^{\#}), H[s,m^{\#}])\, f(s)ds,$

Insurers maximize this subject to the zero profit constraint.

The optimal insurance policy can be formally written as a problem in dynamic optimization (Blomqvist, 1997).[31] The analytic solution balances two factors. The first is the reduced overconsumption from making people pay more out of pocket for medical care. If the coinsurance rate is increased in some range, people in that range pay more for medical care, as do people at all higher levels of spending (because their coinsurance rates have been increased). This increases the efficiency of provision. Countering this, however, is a loss in risk spreading benefits. As people are made to pay more out of pocket, they are exposed to more risk, and this reduces their welfare. The optimal coinsurance rate balances these two effects.

The optimal health insurance policy in practice may be a combination of disease-based and spending-based payments (Chernew and Frick, 1999).Contrast a disease like cancer where minimum treatment involves thousands of dollars with treatment of a common infection. In the former case, it is optimal to have no cost sharing over the range of the minimum acceptable treatment. In the latter case, cost sharing should be highest at low levels of spending. Combining disease and spending based payments is an example of tagging, which I discuss later.

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[31] The problem is formally analogous to the optimal tax problem in public finance when ability is unobservable (Mirrlees, 1971).

V.3 Taxation and health insurance design

A government running a health insurance system could implement the optimal second best policy. Government policy may not be necessary for efficiency, however. In the absence of external influences on insurance policies and with all individuals having the same risk distribution,[32] individuals and insurers would agree to these policies as well. Thus, government policy should treat insurance and out-of-pocket expenses symmetrically.

In the United States, public policy is not neutral towards insurance choices. The most important policy influence on health insurance design is the tax code. Three aspects of the tax code affect health insurance choices (see Gruber and Poterba, 1996, for discussion). First, employer spending on health insurance is excluded from income for personal income taxation purposes, while wage and salary payments are taxed as personal income at the individual level. The price of employer spending on health insurance is thus $(1 - \tau_F - \tau_S - \tau_{SI}) / (1+\tau_{SI})$, where F, S, and SI are the marginal Federal income tax rate, the marginal state income tax rate, and the marginal social insurance tax rate (Social Security, Disability, and Medicare). The numerator of this expression is the personal income tax saved by paying for health insurance instead of giving the money as wages. The denominator grosses this up by the employer's share of social security payments, which is assumed to be born by individuals.

In addition, employee payments for health insurance are excluded from income if they are

[32] If there is heterogeneity of risk, issues of adverse selection arise and may encourage insurers to adopt inferior policies, as discussed below.

part of qualified benefit plans.[33] Not all employee payments meet this criterion; in 1993, about one-quarter of employee payments were made on a pre-tax basis. Denoting E as employer payments for health insurance, G as employee payments, and * as the share of employee payments that are eligible for favorable tax treatment, a share (E+*G) / (E+G) of total employment-based insurance payments are eligible for favorable tax treatment. The share (1-*)G / (E+G) of payments are not and face a relative price of 1.

The employer and partial employee exclusions of health insurance payments are quantitatively important. It is estimated that in 1999 the Federal income tax revenue loss from this exclusion was $60 billion, over 10 percent of total Federal spending on medical care. There were additional losses to Social Security, although these are offset by lower payments in the future, so the present value loss is much smaller (if even positive).

Potentially offsetting these first two factors is a provision allowing individuals to deduct out-of-pocket medical spending from income if such spending is in excess of 7.5 percent of adjusted gross income and if they itemize their deductions. The effective price of out-of-pocket spending is therefore (1-"J_F), where "=1 if the individual has large medical expenses and is an itemizer. Because not many people meet this criterion, the total revenue cost of this provision is much lower, about $4 billion.

Combining these three terms, the relative price of employer-provided insurance compared to out-of-pocket spending is given by:

[33] For discussion of the criteria for a qualified plan, see United States Joint Committee on Taxation (1999).

$$(17) \qquad \frac{P_{HI}}{P_{OOP}} = \frac{\left[\left(\frac{1-\tau_F-\tau_S-\tau_{SI}}{1+\tau_{SI}}\right)\cdot\left(\frac{E+\delta G}{E+G}\right) + \left(\frac{(1-\delta)G}{E+G}\right)\right]}{1-\alpha\tau}$$

Gruber and Poterba (1996) estimate this expression for a representative sample of individuals in 1994. The average person with employer-provided insurance faced a relative price of insurance of 0.66, a 34 percent subsidy to insurance payments relative to out-of-pocket spending. The tax subsidy varies over time with changes in tax rates; as marginal tax rates have declined in the 1980s and 1990s, the tax subsidy has fallen.

This tax subsidy to insurance encourages employees and employers to offer generous health insurance: lower deductibles, coinsurance rates, and stop-loss limits (Feldstein, 1971, 1973; Pauly, 1987). When paid for by insurance, these bills cost less in total than when paid for out-of-pocket. Indeed, one might particularly want to buy insurance for *predictable* expenditures, since the tax benefits of this transaction are most readily realized. Excessively generous insurance, in turn, leads to more moral hazard than is optimal.

The magnitude of the resulting welfare loss depends on the elasticity of insurance coverage with respect to price, and the price elasticity of demand for medical care. A substantial economic literature has examined these two issues. Table 5 presents estimates of the response of health insurance design to price.

Four aspects of the health insurance demand have been estimated. One strand of literature examines the response of firms offering insurance to prices. The most convincing studies examine

how variation in tax rates across states or over time influence firm decisions to offer coverage.[34] Elasticity estimates in these studies range from relatively small (-.4) to quite large (-2.9). A related set of studies examines the effect of taxation on overall firm spending for insurance. This includes the offer decision and other decisions such as the generosity of benefits and the share of premiums that employers pay for. These studies also find a significant response of insurance spending to price, with a general range of -0.2 to -1.0. The fact that this is less than the offering response in some studies may indicate that the lower values of elasticity of offering is correct, or may simply reflect the difficulty of estimating the overall firm response to taxation.

A third set of studies examines the responsiveness of individual purchase decisions to price. Again, the studies using taxes as the source of price variation are most convincing. The responses are of comparable magnitude and variability to the firm estimates, ranging from -0.6 to -1.8.

A final set of studies examines the responsiveness of individual choices of insurance policies when offered multiple plans. One would expect the choice of a particular plan to be more responsive than the decision to purchase insurance at all, and this is indeed the case. While the studies do not all present elasticities, those that do generally report elasticities greater in magnitude than -2 and sometimes as high as -8.

Thus, it is clear that insurance coverage decisions are responsive to price, although the exact

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[34] Other study designs are more problematic. One alternative strategy is to examine whether employers offered higher premiums are less likely to offer insurance (Feldman et al., 1997, Marquis and Long, 1999). The difficulty with this strategy is that insurance premiums are not observed for firms not offering insurance. Thus, some imputation method must be devised, and the results depend critically on that method. In practice, the studies give very different elasticity estimates. A second strategy is to analyze the response of firms to pilot programs that subsidized insurance (Helms et al., 1992; Thorpe et al., 1992), or to hypothetical questions about insurance coverage (Morrisey et al., 1994). The difficulty with these studies is the permanence of the tax change and the relevance of the hypothetical question. These studies also give quite variable answers.

magnitude is not so clear. And the literature has not addressed perhaps the most important question for the welfare loss – the response of specific cost sharing provisions to price. It is the cost sharing provisions, after all, that lead individuals to overconsume medical care. Still, one suspects that this dimension of insurance is responsive to price.

The second empirical question is the effect of insurance generosity on medical care spending. A comprehensive review of the literature on the elasticity of demand for medical care is contained in Cutler and Zeckhauser (2000). Table 6 shows a summary of that literature. A substantial literature in the 1970s estimated the elasticity of demand for medical care using cross-sectional data, or cross-sectional time series data. Pre-eminent among these papers are Feldstein (1971), Phelps and Newhouse (1972), Rosett and Huang (1973), and Newhouse and Phelps (1976). Feldstein (1971) was the first statistically robust estimate of price elasticities using time-series micro data, in this case on hospitals. Feldstein identified the effect of coinsurance rates on demand using cross-state variation in insurance coverage and generosity, estimating a demand elasticity of about -0.5. The subsequent papers use patient-level data and more sophisticated study designs. The elasticities that emerged from these papers ranged from as low as -.14 (Phelps and Newhouse, 1972) to as high as -1.5 (Rosett and Huang, 1973). The implication of this range of elasticity estimates was that moral hazard was likely a significant force.

To identify this key parameter more precisely, the Rand Health Insurance Experiment was designed (Newhouse et al., 1993). That experiment randomized people into insurance plans with different levels of cost sharing and estimated demand elasticities for medical spending. The ultimate elasticity that emerged was -0.2, at the low end of the previous literature. This estimate is generally taken as the gold standard in current research and policy work.

The fact that insurance provision is responsive to price and medical spending is responsive

to insurance implies that there is a welfare loss from the tax subsidy to health insurance. The magnitude of the loss has been estimated by several papers. Feldstein and Friedman (1977) was the first estimate of the magnitude of the loss. Using estimates of insurance and medical care demand from Feldstein's earlier work, Feldstein and Friedman estimate the welfare loss at about 10 percent of medical care spending.

As the elasticities of medical care demand were refined, the estimated welfare loss from the tax subsidy fell. Chernick, Homer, and Weinberg (1987) used a similar methodology and more recent data to estimate the loss from the tax exclusion at about 5 percent.

Other analyses have not examined the tax exclusion per se but have simulated optimal insurance policies and compared them to actual policies. Some of these studies find that optimal insurance is less generous than current insurance policies, consistent with the tax loss hypothesis (Feldstein, 1973; Blomqvist, 1997). Other studies, however, find that current policies are roughly optimal (Buchanan et al., 1991; Newhouse et al., 1993; Manning and Marquis, 1996).[35] The difference between these studies has not been fully reconciled. In light of the empirical evidence above, one suspects that there must be some welfare loss from the tax exclusion. The magnitude is unlikely to be as high as 10 percent, however.

V.4 Qualifications

Several factors are omitted in this analysis. The first is dynamics – insurance can influence the development and diffusion of new technology. As noted above, cost growth in medical care has been persistently above that in the economy as a whole for many decades. A majority of this cost

[35] Feldman and Dowd (1991) compared welfare under a free care plan and a plan with moderate cost sharing (a $1,000 deductible) and found the latter to be preferred.

growth is a result of technological change in medical practice (Newhouse, 1992). The introduction of new procedures and devices, and their application to more patients, have been prominent in medical care. At least some of this technological change likely results from the generosity of health insurance (Weisbrod, 1991). Generous health insurance encourages the diffusion of innovations once they are available, and in turn the development of new innovations.

To the extent that tax policy has led to more generous medical insurance, it has also encouraged additional innovation in medical care. This will have significant welfare consequences, but the direction of these effects is unknown. If medical innovation would have been at the efficient level in the absence of the tax subsidy, the static estimates of welfare loss of the tax subsidy underestimate the true welfare loss. But free markets are not guaranteed to produce the right amount of innovation. Some of the return to medical innovations cannot be appropriated privately, for example general knowledge about physiological and biochemical functioning. The public good nature of this innovation suggests that private market innovation would be too low. In this case, the tax subsidy would be a welfare improvement.

Other arguments suggest that free market innovation might be too high. The patent race literature shows how the prospect of a patent can encourage excessive research, as potential innovators race to become the first discoverer of the good. By further exacerbating this trend, the tax subsidy would result in additional welfare loss.

There has been some empirical work on the value of technological change in medicine. Studies of medical outcomes typically find that the average product of changes in medical technology over time is high (Cutler and McClellan, 2001). Thus, technological change may not have been too rapid, and the tax subsidy may be efficiency enhancing.

A related point is that the tax subsidy may influence the direction of technological change.

For example, it might be the case that without the tax subsidy there would be more innovation in cost-reducing but quality-neutral innovation, while with the tax subsidy innovations are biased towards those that increase quality and cost. The welfare implications of such a bias depend on the same factors that were highlighted in the previous paragraphs.

The second qualification about the welfare loss from the tax exclusion is that it ignores the value of the subsidy in promoting overall rates of insurance coverage. By subsidizing insurance through employment, the tax subsidy encourages more people to be insured than would otherwise be the case. This is important because there are other public subsidies, discussed below, that encourage people to be uninsured. Counteracting these incentives could therefore improve welfare.

This effect may be substantial. Recall that the tax subsidy to insurance is, on average, about 34 percent. If the demand elasticity for insurance is -0.5, well within the range indicated above, the reduction in insurance coverage from eliminating the tax exclusion is about 17 percent.[36] If all these people became uninsured, the uninsurance rate would double. For this reason, many policy proposals have suggested capping, but not eliminating, the tax subsidy to health insurance. If the subsidy were capped at a level roughly equal to relatively inexpensive plans, people would still receive an inframarginal subsidy to purchase insurance, but face no marginal subsidy to choose more generous insurance. The reduction in coverage would be smaller.

Finally, the tax subsidy encourages the provision of insurance through employment. Without the tax subsidy, there would be relatively little reason for employers to provide health insurance rather than just giving employees cash. The link between insurance and employment has both good

[36] Using individual data and a similar elasticity of -0.5, Gruber and Poterba (1996) estimate that employer spending would decline by about 25 percent if the subsidy were eliminated.

and bad consequences. Since employment groups are formed relatively independently of sickness, encouraging insurance through employment minimizes some of the problems of adverse selection that occur when individuals buy insurance on their own. On the other hand, employment-based insurance leads to a host of labor market problems associated with people being 'locked' into jobs because their health insurance would have to change if they changed employers. Some estimates suggest that this job lock plays a significant role in reducing overall rates of turnover in the labor market, although the issue is not settled (Gruber, 2000; Krueger and Meyer, 2002).

VI. The Supply Side

This analysis of optimal insurance has focused entirely on the demand-side of the market – designing incentives to get individuals to reduce their demand for medical care while still reducing risk. Implicitly, providers were being paid at cost, and thus acted as perfect agents for their patients. Insurers and providers did not interact, other than for billing purposes. This was a moderately accurate picture of the market for medical care in the United States up to the early 1980s,[37] but it is no longer a good description of how health insurance operates today. Nor is it relevant for other countries.

In the United States, the dominant trend in the medical care marketplace over the past two decades has been the growth of 'managed care'. Managed care is a collection of insurance arrangements in which utilization and prices are limited on the supply, not the demand-side of the

[37] There is some debate about whether providers were paid at or above cost. Most economists believed that providers were paid above marginal cost and thus 'induced demand' for their services (Fuchs, 1996).

market. Patients usually face little if any cost sharing at the time of service use. Instead, providers face a variety of incentives to control utilization. There are many forms of supply-side restrictions, including forming networks of providers that agree to lower fees, monitoring and prescribing what doctors can and cannot do, and giving physicians financial incentives to reduce utilization.

Figure 6 shows the transformation of the private insurance industry in the United States. In 1980, 92 percent of the population was in unmanaged fee-for-service insurance. Today, the share is below 5 percent. In its place are a variety of managed care plans, including Health Maintenance Organizations [HMOs], Preferred Provider Organizations [PPOs] and Point of Service Plans [POSs].[38] Even traditional fee-for-service plans are generally managed, with the insurer monitoring for excessive utilization and requiring pre-authorization for some services.

Public programs in the United States also use supply side techniques in varying degrees. In most states, a significant part of the Medicaid population is enrolled in managed care plans. Managed care enrollment is much lower in Medicare (only about 15 percent), but the fee-for-service program does make some use of supply side measures. For example, hospitals are paid on a per admission basis for Medicare enrollees. Additional days in the hospital or minor tests and procedures are not reimbursed at the margin.

In most countries with universal insurance systems, medical care utilization is limited by supply-side measures more than demand-side measures. For example, Canada and the United

[38] PPOs are groups of physicians who accept lower fees for access to a network. Patients face less cost sharing when using preferred providers than in using providers outside the network. HMOs include group or staff model plans, where doctors work only for that plan and patients can see doctors only in the plan, and looser network or independent practice arrangement plans, where doctors in the community sign up with one or more plans and may see patients with multiple plans. Point of service plans are HMOs that provide some reimbursement if the enrollee chooses to use providers out of the network.

Kingdom both limit the capacity of hospitals to provide care (for example, by constraining the number of open heart surgery units). As a result, fewer procedures are done, and overall spending is lower. Indeed, the greater ability to use supply-side constraints is almost certainly the reason why countries that operate the medical system spend less than those that provide universal coverage but use private providers.

The availability of supply side techniques opens up a host of issues for the public sector. One central question concerns design of optimal insurance for a country providing such insurance publicly. If one has appropriate supply-side cost sharing, is demand-side cost sharing useful? There is a lengthy literature on this question. A rough summary (Cutler and Zeckhauser, 2000) is that demand-side and supply-side constraints are not perfect substitutes. Both methods limit utilization, but do so on somewhat different margins. Demand-side cost sharing has a relatively greater impact on whether a person visits a provider at all, while supply-side cost sharing has a relatively greater impact on what is done once someone gets into the system. Thus, the optimal public system probably includes a combination of demand and supply side constraints.

A related question concerns the impact of supply-side controls on the welfare loss from the tax exclusion. If managed care eliminates excessive medical care utilization, has the welfare loss from the tax exclusion declined? There is no empirical information on this question. The fact that demand and supply side cost sharing are not perfect substitutes means that there is likely still to be some welfare loss from excessive moral hazard in managed care plans, but it is almost certainly smaller.

Other issues are important as well. For supply-side or demand-side rationing to be efficient, one needs to know that the people not receiving care are the ones who value the care the least. This is not guaranteed to be the case. In the case of demand-side rationing, the evidence generally

suggests few adverse health effects from cost sharing, consistent with the efficient-rationing view (Newhouse et al., 1993). Most estimates of the impact of managed care on health outcomes in the United States reach a similar view; it is hard to find evidence that health is worse under managed care plans (Glied, 2000; Miller and Luft, 1997). In other countries, however, outcomes do appear to suffer because of supply side constraints (Cutler, 2001).

These issues are too complex to be addressed in detail in this chapter, however. For additional discussion, interested readers should consult Glied (2000) or Cutler and Zeckhauser (2000).

VII. Heterogeneous risks and selection

I now turn from the analysis of a single individual purchasing insurance to a market setting with multiple individuals. The central complication introduced by this is the heterogeneity of risk: some people are at high risk of being sick, while others are at low risk. On average, people at higher risk for disease want more generous insurance than those at lower risk. This fact creates enormous difficulties for insurance markets, as I now demonstrate.

VII.1 Risk segmentation

To illustrate the problems that result from individual heterogeneity in insurance demand, consider a simple model with two risk types. Low risks have a small probability of being sick, while high risks have a greater probability. Both groups would like to purchase insurance, because for each group there is uncertainty about whether they will be sick. To keep matters simple, I suppose there is no moral hazard or other insurance market imperfection. I further assume that insurers know

as well as individuals their expected risk; with genetic tests and medical histories, such knowledge is becoming increasingly common.

The analysis of this situation is shown in Figure 7. Rather than one line with fair insurance, as presented in figure 4, there are now separate fair odds lines for high and low risks. The fair odds line for high risks lies inside that of low risks, since a greater premium is required to get a given payment when sick.

Offered the option of purchasing insurance at actuarially fair prices, both high and low risks will choose to buy full insurance; in the absence of moral hazard there is no reason not to do so. The equilibrium will therefore be at A and B. Both groups are fully insured, but high risks pay more for insurance than low risks.

In practice, if high risks are sufficiently risky or expensive, the insurer may simply choose not to offer these very high risk groups coverage rather than charge the required price and face public relations difficulties. High risks might then be "medically uninsurable. This is a more of a political than an economic term, however.

The equilibrium in Figure 7 is efficient *given risk types*. But from an *ex ante* perspective, before people know their risk type, it is not. Consider asking people before they know if they are high or low risk – potentially before birth – whether they would like to buy insurance against the probability that they will be high risk and thus face higher insurance premiums. Individuals would be willing to purchase this insurance were it sold at an actuarially fair price; they get a reduction in financial uncertainty at no expected cost. The fact that people wind up paying different prices for insurance reflects the failure of this insurance market.

This loss seems counterintuitive: everyone has full information and gets full insurance every year. What is the source of the loss? The welfare loss derives from a missing market for insurance

against one's risk type. Risk averse individuals would like to insure against the possibility of being discovered to be high risk. There is no market where they can do so. Given that a market is missing, there is no guarantee that efficient pricing on the basis of known information as opposed to level pricing (as if ignorant) will enhance welfare. This is a classic illustration of the theory of the second best.

The market failure might also be thought of as stemming from a contracting failure. Contracts for health insurance are renegotiated after medical information is known. Such periodic recontracting allows new information to enter into the contractual arrangement over time, which individuals *ex ante* would choose to keep out.

It is possible to imagine private contracts that solve this problem (Cochrane, 1995; Pauly, Kunreuther, and Hirth, 1995). Suppose that people purchase two insurance policies each year; one to cover their medical costs that year, and a second "premium insurance" policy to cover any increase in premiums they may face in the future as a result of information learned that year. Full premium insurance would give people an amount of money equivalent to the discounted expected increase in their future medical spending from events that year.

Such premium insurance does not exist; the question is why. Several factors have been identified. Regulatory barriers have been suggested as the culprit (Cochrane, 1995). Moral hazard (people with premium insurance would take insufficient care of their health) and adverse selection (people expecting declines in health would more likely take up the insurance) are possibilities. The aggregate risk phenomenon provides a fourth explanation (Cutler, 1996). Implementing such contracts requires a lot of information about how changes in health status today affect the entire future course of expected medical spending. There is substantial uncertainty in this forecast which full premium insurance would have to insure against. But future medical cost changes will be

common to everyone with the contract. As a result, insurers will be unable to diversify this risk.[39] For all but the first explanation, private markets will be imperfect, and government intervention is warranted.

VII.2 Adverse selection and market failure

The government might respond to the risk segmentation problem by requiring insurers to offer everyone the same price for each contract. Many employers who run health systems for their employees do this. Indeed, information systems were historically not well enough developed for insurers to differentiate who was high and low risk; they could only set one price for each group.

This pooling at first glance seems to solve the risk segmentation problem, since everyone can enroll in each plan at the same terms. But the solution is illusory. It moves from a system of full information to one of asymmetric information: individuals know more than insurers about their risk types. In such an situation, market outcomes will again be inefficient. This analysis was first demonstrated by Rothschild and Stiglitz (1976) and Wilson (1977).

This inefficiency can be demonstrated using Figure 8. Constrained to charge only one price per plan, suppose that insurers offer plan C, full insurance at the group average price (assuming equal numbers of high and low risks). Plan C is a pooling equilibrium; it fully insures *ex ante* risk, thus solving the risk segmentation problem. But plan C is not stable. Consider an insurer that came along and offered a policy that was a bit less generous than plan C but cost less, such as plan D.

[39] Insurers might get around this the way that they do with term life insurance: guaranteeing the right of renew at then prevailing prices. But then the value of the insurance product is limited, as people are locked into one policy.

Low risk people would choose plan D over plan C; since they are overpaying for insurance, low risks prefer less generous insurance if they can get it at existing prices. High risks prefer C to D; given the implicit subsidy they receive, high risks want full insurance. As a result, introducing plan D would break the pooling equilibrium. Rothschild and Stiglitz and Wilson show that in a competitive insurance market with two risk types, pooling is not an equilibrium; low risks will never voluntarily pool with high risks.

There is only one possible equilibrium, shown in Figure 9. That equilibrium involves high risks in plan A and low risks in plan F. Plan A provides full insurance at actuarially fair rates for high risks. Plan F is the most generous actuarially fair plan for low risks that is not preferred by the high risks to plan A. High risks are tempted to join plan F by the low premium, but are discouraged by the incomplete coverage. Plan F is just stingy enough to make switching unattractive for high risks. Low risks would prefer more generous coverage at their risk-specific cost, but this cannot be obtained without also pooling with the high risks.[40]

There are two inefficiencies in this equilibrium. First, high risks have to pay more for their coverage simply because they are high risk, the risk segmentation problem noted above. Second, low risks do not obtain full insurance coverage, even though full insurance is optimal. Plans distort themselves to attract low risks, in the process reducing the value of their insurance.

In this model, the generosity of insurance coverage is measured by the amount paid in the sick state; but in practice other dimensions of the plan may be used as screening devices. For

[40] This discussion has been presented in a case where individuals are paying for the cost of insurance and thus pay less when they join plans with low risk people. A related situation is present if all people are given a uniform voucher for insurance. Then, low risks do not benefit by having plans for low risks only, but insurers do. As a result, insurers will design the same sort of policies.

example, having good cancer care is likely to appeal to the sick more than the healthy; thus, plans for low risks will avoid such specialists. Well baby care or complementary health club memberships, which appeal to the low risks, would be better. Even advertizing and location can be used to select good and bad risks.

Rothschild and Stiglitz go further and show that even the separating equilibrium may not be stable. Figure 9 also shows this situation. Suppose that instead of an equal mix of low and high risks, the economy consists almost entirely of low risks. Thus, the fair odds line for the two risks together is the dashed line. Relative to utility at point F, the low risks would prefer a pooled policy such as G. The high risks would prefer G as well, since they get a much lower premium and only somewhat less coverage. Point G would thus undermine the separating equilibrium. But the analysis above still holds; the pooling equilibrium is not stable either. Thus, with no stable pooling equilibrium and no stable separating equilibrium, the market will not reach an equilibrium.[41]

The simple two-risk example of adverse selection suggests that if an equilibrium exists, high risks will receive full coverage, while low risks will receive only partial coverage. Very different, but still inefficient, equilibria can be achieved with multiple risk types (Feldman and Dowd, 1991; Cutler and Reber, 1998; and Cutler and Zeckhauser, 1998). Suppose there are two health plans, a generous plan and a moderate one. It is easiest, although not necessary, to think of the generous plan as a traditional service benefit policy and the moderate plan as a managed care policy. There is a continuous distribution of risks in the population, denoted by s. For simplicity, I take s to be the

[41] Many papers have analyzed equilibrium in such markets. Some equilibrium concepts do yield an equilibrium, but in no case is the equilibrium first best efficient. Wilson (1977) and Riley (1979) proposed equilibria where insurers do not offer plans if those plans would become unprofitable if other plans left the market (Wilson) or if other plans entered the market (Riley). Grossman (1979) proposes a model where insurers can screen applicants before selling them insurance, thus limiting losses from high risks.

person's expected spending in the generous policy. The value of more generous insurance to an individual is V(s), where V$_s$>0 (the sick value generous policies more than the healthy).[42] Figure 10 shows V(s). At any additional cost for choosing the more generous policy, people will divide into plans by risk. If s* is the sickness level of the person indifferent between the two policies, people with s>s* will choose the generous policy, and people with s<s* will choose the moderate policy. Average sickness in the generous and moderate policies are $s_G = E[s|s>s^*]$ and $s_M = E[s|s<s^*]$.

Suppose that the moderate policy costs a fraction " ("<1) of what the generous policy would spend for the same person.[43] In a competitive insurance market, premiums will equal costs: $P_G = s_G$, and $P_M = " s_M$. The premium difference between the two plans is therefore:

(16) $) P(s) = P_G - P_M = (1-") s_M + [s_G - s_M]$

The first term in this expression is the cost savings the moderate plan offers to its average enrollee. The second term is the difference in the average sickness level in the two plans, a consequence of adverse selection.

As marginal people move from the generous to the moderate plan, the average sickness in each of the plans will rise. Depending on the distribution of s, the price difference between plans may widen or narrow. Because medical spending in practice is significantly right-skewed (Table 4), it is natural to conjecture that the premium in the generous plan will rise by more than the premium in the moderate plan. Figure 10 reflects this expectation as an upward sloping $) P(s)$

[42] It is not needed that V depends only on s. All that is needed is that V is correlated with s in some fashion.

[43] For example, empirical evidence suggests that HMOs spend about 10 percent than traditional service benefit policies for the same individuals (Glied, 2000).

curve.

Equilibrium is where the price difference and enrollments are consistent, at point E. Point E is unlikely to be efficient, however.[44] The efficient price is where the marginal person pays exactly his additional utilization to join the generous plan. Defining s^* as the efficient marginal peson:

(17) $\Delta P^{marg}(s^*) = (1-\theta)\, s^*$,

The difference between equilibrium and efficient prices is two-fold. The first term in equation (16) is generally below the efficient differential in equation (17); it represents the savings from the moderate plan for the *average* person in the moderate plan, not the *marginal* person in the plan, for whom the savings would be greater. Working in the opposite direction, adverse selection (the second term in equation (16)) will raise the premium in the generous plan relative to the premium in the moderate plan. Depending on the distribution of medical expenditures, the market differential could be above or below the efficient level. The right skewness of medical spending suggests that the adverse selection effect will tend to predominate. This is shown in Figure 10 by virtue of the fact that the $\Delta P(s)$ line is above the $\Delta P^{marg}(s)$ line. The premium differential for the generous plan is above the efficient differential, and too few people enroll in that plan.

Indeed, it is possible that because of adverse selection, the generous plan itself may disappear. If $\Delta P^{alt}(s)$ described the cost differential rather than $\Delta P(s)$, then V(s) would not intersect that line and the equilibrium would have no enrollment in the generous plan. The generous plan would disappear because at every price difference, the marginal person always finds the cost savings

[44] To be precise, efficient given risk types. There is still the case for full pooling of risks to insure one's s.

from the moderate plan sufficiently large to prompt switching.[45] The disappearance of generous plans as a result of dynamic processes of adverse selection is termed a "death spiral". Thus, in this example too few people will have generous insurance coverage.

Considering the various equilibria, there are no guarantees about what an equilibrium with adverse selection will involve, if in fact there is an equilibrium. But the final equilibrium will involve potential welfare losses from three sources. First, people may be in the wrong plans. Adverse selection prompts people at the margin to enroll in less generous policies, when on the basis of their own preferences and costs more people would choose generous plans. Second, plans have incentives to distort their coverage to attract the low risks and repel the high risks. This incentive is present for *all* plans. Every plan gains by being less generous, because at the margin it changes the risk balance towards a lower risk population. This is true even if every person would be willing to pay for it at his actuarially fair rate.[46] Third, people pay more for insurance when they are sick than when they are healthy. This denies people the *ex ante* pooling of risk types that people would want at a fair price.

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[45] A numerical example illustrates this possibility. Suppose that the highest cost person has expected spending of $50,000 and that average costs of the population as a whole in the moderate policy (with or without this person, if he comprises a small part of the total risk) is $3,000. Suppose further that the high cost person values the generous policy at $20,000 more than the moderate policy, and that he spends only $5,000 less in the moderate policy than with the generous policy (a 10 percent savings). Efficiency demands that he should be in the generous policy; the additional value of that policy ($20,000) is greater than the additional cost he imposes there ($5,000). If the high cost person were the only person in the generous policy, however, the cost of that policy would be $47,000 more than the cost of the moderate policy ($50,000 versus $3,000), which would lead him to opt for the moderate policy.

[46] There is an apocryphal story such a situation. A firm was providing benefits to its employees and noticed that all plans put a 90 day limit on inpatient care for mental health benefits. The employer when to the various insurers and asked about the cost of removing the cap. The insurers all replied that they didn't have such a cap in practice, they just said they did to discourage people with severe mental health problems from enrolling in their plan!

VII.3 Evidence on the Importance of Biased Enrollment

A substantial literature has looked for biased enrollment in insurance markets, the key to adverse selection. This literature is summarized in Cutler and Zeckhauser (2000). Table 7, taken from that paper, shows evidence of enrollment differences along three dimensions: traditional insurance versus managed care; overall levels of insurance coverage; and high versus low option coverage.

Most empirical work on adverse selection involves data from employers who allow choices of different health insurance plans of varying generosity; some of the studies look at the Medicare market, where choices are also given. In essentially all of these cases, the data show strong evidence of adverse selection.[47] Adverse selection is present in the choice between fee-for-service and managed care plans (8 out of 12 studies, with 2 findings of favorable selection and 2 studies ambiguous), in the choice between being insured and being uninsured (3 out of 4 studies, with 1 ambiguous finding), and in the choice between high-option and low-option plans within a given type (14 out of 14 studies).

VII.4 Evidence on the Importance of Plan Manipulation

There are substantially fewer empirical studies on whether plans manipulate their benefits to attract a healthier mix of enrollees than on biased enrollment. Plans, of course, differ greatly in their generosity. But it is difficult to know how much of this variation reflects manipulation by the

[47] The metric to measure adverse selection is not the same in all studies, ranging from the difference in premiums or claims generated by adverse selection after controlling for other relevant factors (for example, Price and Mays, 1985; Brown et al., 1993) to the likelihood of enrollment in a generous plan conditional on expected health status (for example, Cutler and Reber, 1998) to the predominance of known risk factors among enrollees of more generous health plans compared to those in less generous plans (for example, Ellis, 1989).

plans to attract healthy risks as opposed to differential estimates of the most efficient care arrangements.

Though evidence on plan structures is ambiguous, the marketing of managed care plans shows clear efforts to promote favorable selection. Maibach et al. (1998) document the marketing practices managed care plans use to attract healthy Medicare enrollees, including television ads that show seniors engaged in physical and social activities and marketing seminars held in buildings that are not wheelchair accessible.

VII.5 Public policy with heterogeneous risks

Risk segmentation and adverse selection create a clear case for government intervention. This is unlike moral hazard, where private markets have as much ability to combat the problem as the government. Here, the government's ability to compel certain actions is important. The most obvious public solution is to mandate that everyone have insurance, and that they belong to the same plan. Mandatory coverage is required to prevent the healthy from declining coverage. A single plan is required to prevent sorting by risk. This solution is termed single payer insurance. It is the foundation of many health care systems around the world.[48] Adverse selection was an explicit concern in the foundation of many public insurance systems.

Single payer systems have other drawbacks, however. Universal systems require substantial income transfers to the poor. In addition to the political economy difficulty of taxing the rich to give to the poor, there are efficiency considerations from raising the taxes used to finance the transfers.

[48] In Canada, for example, everyone receives health insurance from their provincial government; there is no choice about the policy and no option to be uninsured. In the United Kingdom, a base insurance plan is required for everyone, although people can supplement that plan with private insurance.

Further, issues of government efficiency, noted in Section IV in the case of government versus private provision, are raised here as well. For these reasons, governments have pursued other options as well.

A second solution is to regulate some degree of pooling more than private markets alone would provide. In the early to mid-1990s, state governments in the United States passed a number of pieces of legislation to limit risk segmentation. This was followed by Federal legislation in 1996. Problems of premium variability are much more acute for small firms than for large firms, since large firms have an internal risk pool that can be used to smooth spending. Thus, this legislation generally applies only to small firms, for example those with fewer than 50 employees. This insurance legislation consisted of some or all of the following: limitations on the rates that could be charged high and low risk purchasers, for example that such rates be no more than 15 percent above or below average; requirements that insurers guarantee enrollment to new or existing purchasers seeking to renew; and requirements that people moving from one policy to another policy not face pre-existing conditions exclusions or length of service requirements before enrollment.

The impact of this legislation has been the subject of some research. One would expect such legislation in the first instance to compress premium variability. This, in turn, might then affect rates of insurance coverage. The predicted change in coverage is unclear, however. On the one hand, some high risk people whom insurers had previously refused to underwrite or who decided to be uninsured because of high premiums might now purchase coverage. On the other hand, some healthy people could choose not to purchase insurance as their rates increased. The overall implications for rates of insurance coverage are not known *a priori*.

Premium data are much less available than coverage data. Thus, most of the research on the impact of this legislation has focused on overall rates of insurance coverage. Some studies also

examine other outcomes, such as who has access to insurance (sick or healthy) and whether small firms offer insurance to their workers. These studies are summarized in Table 8. The studies use a variety of approaches; some use a difference-in-differences approach, comparing changes in insurance coverage in states that adopted reforms at different times; some also compare changes for small and large firms in states that passed such legislation versus states that did not pass such legislation. Other studies do more detailed case studies of reforms in particular states.

A consensus from the studies in Table 8 is that there is no effect or very small effects of insurance regulation on overall rates of coverage; negative impact on coverage are more commonly found in studies of individual market regulations, although these effects tend to be small. Additionally, where the authors attempt to look at the effects of regulations on insurance coverage by risk type, they often find that rates among the sicker rise, while rates among the healthy fall somewhat.

There are several possible explanations for a lack of large findings. One problem has to do with the scope of the legislation. States are allowed to regulate purchased insurance but not rates for firms that self insure. A small firm that formally purchased insurance can choose, after the legislation, to self-insure and purchase stop-loss coverage for individual claims exceeding certain levels. This alternative insurance arrangement, often through the same insurer, involves little or no change in risk born by the firm but gets the firm out of the legislative mandate. A trend towards self-insurance occurred after these regulations were put in place.

A second explanation is that the legislation was undone by the presence of multiple plans. While legislation sometimes required insurers to offer all groups the same price for each policy, groups of healthy employees can still choose less generous policies as a whole and maintain their lower rates, provided that less healthy groups choose not to enroll in those plans. In some cases,

insurers were not required to make all plans available to all firms, thus allowing healthy firms an option separate from less healthy firms. In other cases, adverse selection appears to be the source of the failure. Buchmueller and DiNardo (forthcoming) show that many firms moved into managed care plans after such legislation was passed, presumably for adverse selection reasons. In light of all the evidence, it thus seems clear that regulation by itself cannot offset the problems resulting from biased enrollment. Some other solution is also needed.

Since the problems of risk segmentation and adverse selection ultimately result from plans not receiving enough money for high-risk people compared to low risk people, one can think about subsidizing plans that enroll high risk people as a way to combat this situation. Figure 11 shows how a system of subsidies would work. Starting from the initial separating equilibrium at plans A and F, consider increasing required payments by the low risks and using the money to lower required payments by the high risks. High risks still receive full insurance but have more income available when sick and healthy; their equilibrium point moves out along the 45 degree line. As low risks are made to pay more without receiving additional benefits, their budget constraint rotates inward. If the subsidy equalized rates, the equilibrium would be the pooling equilibrium in Figure 8.

Some amount of subsidy is valued by low risks (Miyazawa, 1977; Spence, 1978). Although low risks pay above expected cost to finance the transfer to the sick, the fact that the high risks can afford insurance at lower cost makes them less likely to opt out of their plan for the low risk plan. Thus, the healthy can increase the generosity of the policy they choose. But not all subsidies are so valued. For complete equality to be achieved (plan C), the healthy must be mandated to participate in the system.

This form of differential payment by health status is termed “risk adjustment” (van de Ven

and Ellis, 2000). Risk adjustment must be carried out by a government, or a private agency acting like a government,[49] since given the choice, low risks would not voluntarily enter a risk adjustment system.

One way to implement risk adjustment is as a voucher system with differential vouchers for high and low risks. A sufficiently high voucher for the high risks would be enough to offset their higher expected costs. Alternatively, risk adjustment can also be implemented at the plan level. The voucher amounts would be equal, but plans would receive subsidies or pay penalties based on the risk distribution of their enrollees. Plans with low risks would pay money to plans with high risks.

If governments can risk adjust perfectly, adverse selection can be solved and the first best achieved. This is not surprising; it is tantamount to assuming away the information problem that led to adverse selection in the first place. Designing such a system in practice is more difficult, however, because of moral hazard. Typically, the way that one measures risk status is by looking at medical care utilization. People with greater medical claims or more adverse diagnoses are deemed less healthy. But such attributes are under the control of the individual and insurer. If the government pays more for diabetics, for example, the plan can screen carefully for the disease. If the government pays more for very expensive people in general, the incentives to hold down costs are muted. This type of moral hazard limits the desired risk adjustment, just as moral hazard limits optimal risk sharing in the standard case of insurance plan design.

To date, few governments or other organizations have used formal risk adjustment systems (Keenan, Beeuwkes-Buntin, McGuire, and Newhouse, 2001). The Medicare program in the United States has just moved to such a system, however, and more information will be available in coming

[49] For example, an employer running an insurance plan in the interests of all of his employees.

years. Evaluating the impact of these systems will help guide future policies.

Returning to the discussion of section V, one can view the tax subsidy to health insurance as an implicit risk adjustment system. By lowering the price of insurance through employment, the subsidy bribes healthy people to pool with less healthy people at their workplace. Since employment is not perfectly correlated with health, this mutes the impact of poor health status on insurance premiums.[50]

VIII. Combining public and private insurance

The previous section examined the problems inherent when heterogeneous people wish to choose different health plans. Without adequate risk adjustment, it was shown that plans might be insufficiently generous, to avoid attracting high risk people. To get around this problem, some countries have mandated that everyone be enrolled in a basic plan that covers services up to a minimally acceptable level, and then allow people to supplement that package with more generous insurance if they wish. This solution seems reasonable on first blush, but it too suffers substantial problems.

Private supplemental insurance might take one of three forms. One type of insurance is for services that the basic plan does not cover. For example, Medicare in the United States does not

[50] The extent to which costs are fully pooled depends on the degree to which individual wages reflect individual health insurance costs. There is strong evidence that employees as a whole bear health insurance costs, but little evidence about whether this occurs on a worker-by-worker basis.

cover outpatient prescription drugs,[51] or most long-term care expenses. Supplemental insurance to cover uncovered services is allowed in most countries, including the United States. About half of the elderly in the United States have private insurance to cover prescription drugs, largely through Medicaid or a former employer.

As one might imagine, adverse selection is a substantial problem for such markets. In the individual market for insurance coverage to supplement Medicare, for example, very few people buy packages with pharmaceutical coverage, and those that do pay dearly for the care (Ettner, 1997). Supplemental insurance for uncovered services also has cost implications for the public sector. People with coverage for a supplemental service will use more of that service than they would in the absence of insurance. This additional service use might increase or decrease use of services covered under the basic plan, depending on whether covered and uncovered services are complements or substitutes. Coverage for prescription drugs in the United States seems to have relatively little effect on use of physician and hospital services, but the impact of covering other services such as long-term care could be larger (Cutler, 2000).

A second type of insurance is to pay for cost sharing required under the basic plan. The cost sharing required under the Medicare program is high: nearly $800 for inpatient care and 20 percent coinsurance with no stop loss for outpatient care. At their discretion, Medicare beneficiaries can obtain supplemental insurance to pay for these out-of-pocket costs.

This form of supplemental insurance has even clearer cost implications for the government. People who insure required cost sharing use more services than those who do not. Some of this additional utilization is paid for by the public sector. For example, consider a person who has

[51] The same is true in Canada for the non-elderly population

pneumonia and has the choice of staying in a hospital for observation or staying at home. Suppose that the hospital stay will cost $2,000. If the person faces an $800 deductible, he might choose not to enter the hospital. With a supplemental insurance policy covering the deductible, however, the person enters the hospital. Only $800 of the additional utilization is paid for by the supplemental insurer; the remaining $1,200 is paid for by the primary policy. The supplemental insurance policy is in effect subsidized by the primary plan. This subsidy encourages essentially all elderly without employer-based supplemental insurance or Medicaid to purchase this coverage. Between Medicaid, employer-based supplemental insurance, and individually-purchased supplemental insurance, nearly 90 percent of Medicare beneficiaries have eliminated the cost-sharing in the Medicare policy. The cost implications of this insurance are large.[52] Christensen and Shinogle (1997), and United States Physician Payment Review Commission (1996) estimate that people with supplemental insurance use 20 to 30 percent more Medicare services than those without such coverage.

The third form of supplemental insurance, and the most controversial,[53] is insurance to pay for services already covered under the basic package. The supply-side restrictions on medical service use imposed in many countries have led to waiting lists for care. In some cases, people might have to wait a year or longer for access to non-emergency services. In the face of these waiting lines, some people would choose to pay for private insurance (or pay physicians privately) which would allow them to jump to the front of the queue.

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[52] Estimating these additional costs is not straightforward. The additional utilization of people with supplemental coverage over those without it is a product of both moral hazard and adverse selection (since sicker people value supplemental insurance more than healthy people). To estimate the importance of moral hazard, one must first back out the share due to adverse selection or find an instrument for insurance coverage separate from health status.

[53] See Propper and Green (1999) for discussion.

This type of insurance can increase total service utilization at low out-of-pocket cost. Consider a person with a broken hip. On the public system, the person may face a year wait to visit an orthopedist, who then schedules surgery several months later. Supplemental insurance might pay for an orthopedist visit right away. The person can then join the smaller waiting list for the surgery (perhaps moving up in that line, with additional payments to the surgeon), and have the public sector pay for that care. For the cost of one orthopedist visit, the person cuts the length of the wait by a year or more.

The belief that supplemental insurance enables rich people to jump the queue at the expense of poor people has led to this type of insurance being banned in many countries, such as Canada.[54] In other countries such as the UK, supplementary insurance is allowed and is held by nearly 20 percent of the population. Still others pay out-of-pocket to jump the queue.

While those with supplemental insurance certainly benefit from such a system, it is not obvious that those left behind lose out. In the orthopedist example, when the person pays the orthopedist privately, resources are saved by the public plan. If these resources are used to expand the supply of medical services, the remaining enrollees in the queue will benefit as well, albeit not as much as those with private insurance. In practice, it is not obvious that payments for salaried physicians adjust in an appropriate manner, and some countries have notorious examples where physicians abuse the system to collect multiple salaries. In that case, allowing supplemental insurance could harm those not sufficiently wealthy to afford it.[55]

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[54] Canadians can come to the United States for care. Such events are relatively rare, however, and they pay the full cost for the care.

[55] The political economy of this type of supplemental insurance has also drawn attention. If the rich can opt out of the public system at will, their demand for a high-quality public sector may decline, potentially leading to an unraveling of support for public insurance (Gouveia,

IX. Equity Concerns and Policy for the Poor

Equity concerns dominate many public considerations about health care. They were a driving force behind national health insurance in many countries and are a perennial issue in countries like the United States without a national system. I start off by characterizing the medical care utilization of the poor and then turn to the public policy issues.

IX.1 Medical care for the poor in the United States

The main health insurance program for the poor is Medicaid. Medicaid eligibility is complex; only a brief summary is presented here (see Gruber, forthcoming, for a detailed discussion of Medicaid and evidence on its effects). Traditionally, Medicaid eligibility was tied to receipt of cash welfare assistance, formerly known as Aid to Families with Dependent Children (AFDC) and currently known as Temporary Assistance to Needy Families (TANF). AFDC eligibility was restricted to low-income single women with children. Income cutoffs were generally about 50 percent of the poverty line.

1997). But the opposite result may also occur. The waiting lines the rich face in the absence of supplemental insurance may diminish their support for public insurance entirely. Scattered empirical evidence suggests that the political economy consequences of opting out have been small (Burchardt, Hills, and Propper, 1999; Globerman and Vining, 1998).

A further concern is whether having a private sector erodes the monopsony position of governments. If being a monopoly purchaser is a key part of how governments hold down prices, allowing other purchasers will result in increased government costs. In the short run, this would be an efficiency loss, as suppliers are paid more for the same product. Over the long-term, the welfare consequences depend on the supply elasticity of service provision.

In practice, this left out a lot of needy people. Many pregnant women and young children were not eligible for Medicaid because of family circumstances (the woman was married or living with someone) or because they had income slightly above the AFDC eligibility line. Providing health insurance for these groups was thought to be particularly valuable, and perhaps even cost saving, since keeping pregnant women healthy might reduce the occurrence of costly care for premature birth (Institute of Medicine, 1985).

As a result, in the late 1980s and early 1990s, there was a dramatic expansion of the Medicaid program. Figure 12 shows eligibility rules in 1999. All pregnant women and infants with incomes below 133 percent of the poverty line are eligible for Medicaid, independent of whether they live in a single or dual parent family. At state option, this can be extended to 185 percent of the poverty line. Children aged 1 to 5 are eligible for Medicaid up to 133 percent of poverty, and children aged 6 to 15 are eligible up to the poverty line. Children aged 16 and older are eligible only up to lower incomes, about 41 percent of the poverty line, but this is being extended to the poverty line as the youngest of these children age. These expansions doubled the share of women eligible for Medicaid if pregnant and increased the share of children eligible by a third.

More recently, there was a further expansion of health insurance eligibility for children. The Child Health Insurance Program (CHIP) was enacted in 1997, with the goal of increasing coverage to even higher levels of income. Under the CHIP, states can cover children in families with incomes below 200 percent of poverty. The new coverage can be through Medicaid or other systems. CHIP enrollment has been relatively slow (less than 2 million children covered within the first two years, compared to Medicaid coverage of 12 million), however, so there has not been a lot of analysis of this program to date.

The net impact of these changes is shown in Table 9. I report health care coverage for the

non-elderly population by income in 1986, prior to most of the expansions, and 1998.[56] The table groups people into three income categories: the poor (income below the poverty line); the near poor (income between poverty and twice poverty); and the non poor (income above twice poverty). The impetus behind the Medicaid expansions is readily apparent; nearly as many people between poverty and twice the poverty line were uninsured in 1986 as compared with those with lower incomes.

Medicaid coverage has increased significantly among the near poor – the major expansion group – from 12 percent to 17 percent of that group. Medicaid coverage fell among the lowest income group, as welfare reform and a strong economy moved people off the welfare rolls. [57] Medicaid coverage has historically been low among the non-poor.

Being uninsured does not mean that one goes without medical care. Partly by law and partly by tradition, hospitals provide care for all people with medical emergencies, whether or not they can pay. This 'uncompensated care' has been estimated at about 5 percent of total hospital costs. Physicians provide some care to the uninsured as well, but the amounts are lower. Of course, no care can be truly uncompensated.[58] Hospitals finance unreimbursed care by charging more to those with insurance and using those revenues to pay for the uninsured.

IX.2 Optimal policy for the poor

The central question facing governments is how to design a medical care system for the poor.

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[56] There have been some minor changes in the CPS wording about health insurance over this time period, but they are not sufficiently large to explain the trends shown.

[57] The magnitude of this change is large, and it is not completely clear why it all occurred.

[58] Hospitals do receive donations, but donations have fallen over time relative to the costs of medical care.

Universal insurance coverage is one option: the government could raise taxes (income, payroll, or consumption) to finance universal coverage. The tax and insurance issues involved in this were discussed above; I do not repeat that discussion here. A second option is a partial public program. This is what the United States has pursued through the Medicaid program: some people are eligible for public insurance but others are not. Overall coverage is a mix between public insurance, private insurance, and uninsurance.

The choice between universal and targeted programs is a classic tradeoff in public finance (Akerlof, 1978).[59] Because universal programs involve more public spending, the deadweight loss from taxation is greater. But partial programs lead to other distortions that universal programs avoid: people will change their behavior to qualify for a partial program, where they would not need to do so under the universal system. Behavioral change might take several forms. People with income above the eligibility line might work less than otherwise would, so they qualify for public insurance. They might change their family circumstances as well, for example not being married. Finally, they might drop their private insurance coverage if they are eligible for the public program. In addition, partial programs have the problem that people may not know about them, and thus may not use the services at the right time.

The Medicaid expansions of the late 1980s and 1990s provide an ideal window to examine these issues. By extending eligibility to higher income groups and dual parent families, the expansions encouraged more Medicaid beneficiaries to work and provided incentives for families to stay together. On the negative side, they also encouraged higher income people to drop their

[59] Akerlof compared a program focused on income alone to one also conditioning on another factor. The income-only program is effectively a universal one.

private coverage and enroll in Medicaid.[60] This 'crowding out' of private coverage has become a central concern of the literature because it increases the cost of the Medicaid program without substantial health benefits.

IX.3 Crowding Out: Theory and Empirical Evidence

Figure 13, taken from Cutler and Gruber (1996a), shows the economics of crowding out. Health insurance purchase is shown on the vertical axis; spending on other goods and services is on the horizontal axis. Indifference curves I_1, I_2, and I_3 show three people with the same income but different valuations of health insurance. Person I_1 is uninsured, I_2 chooses moderate insurance, and I_3 chooses very generous insurance.

Now suppose the government introduces a free[61] health insurance program offering medical care at quality m. The program is designed for people without insurance. But the program can only be offered on the basis of income. Thus, all three people are eligible. This program is more appealing than the status quo for both I_1 and I_2. The increased insurance coverage of I_1 is intended; I_2 has been crowded out of private coverage.

Crowding out increases the cost to the government of public programs relative to the benefits. The coverage expansion may have a positive benefit-cost analysis for I_1 but a negative benefit-cost difference when I_2 joins the program.

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[60] The incidence of employer payments for insurance has been a subject of much debate. Theoretical and empirical work generally agree that employees pay for health insurance costs in the form of lower wages. But whether this incidence is on a worker-by-worker basis or a more aggregated level is not clear. See Gruber (2000) and Krueger and Meyer (2000) for discussion.

[61] For simplicity, I ignore the impact of the taxes needed to finance the program. They would not alter the conclusions of the analysis.

Table 9 provides some evidence on the potential magnitude of crowding out. In 1986, before the Medicaid expansions, half the near poor population had private insurance. Roughly one-third were uninsured. Thus, unless the Medicaid expansions were carefully designed to discourage those with private insurance from enrolling, there could be significant crowdout.

A central empirical issue is how extensive this crowding out has been. Significant research has been directed to this question, which is summarized in Table 10. The first study to examine this question was Cutler and Gruber (1996a).[62] They analyzed the magnitude of crowding out using data from the 1988-93 Current Population Surveys (CPS). Different states raised their Medicaid eligibility criteria at different times, and started from different initial levels of coverage. Thus, there is significant geographic variation in the size and timing of the Medicaid expansions. Cutler and Gruber used this variation to identify crowding out. They estimated that crowdout was about 50 percent: for every two people taking up Medicaid, one person left private coverage.

The surprising magnitude of this finding has sparked a number of additional studies using different sources of data and methodologies. All of the studies find evidence of crowdout, although the magnitude of the crowdout varies. Studies using CPS data, based on repeated cross-sections of the population and examining cross-state as well as time series variation, tend to give similar findings to Cutler and Gruber (Shore-Sheppard, 1996). Studies using the Survey of Income and Program Participation or the National Longitudinal Survey of Youths, generally following particular individuals over time, find smaller estimates of crowdout, in the 10 to 20 percent range (Dubay and Kenney, 1996, 1997; Blumberg, Dubay, and Norton, 2000; Yazici and Kaestner, 1998). One would not expect panel data to yield the same estimate of crowdout as repeated cross sections, since it

[62] See also Cutler and Gruber (1996b,c).

examines only whether people drop private coverage when made eligible for Medicaid. Other effects could lead to crowdout, since as people not taking up coverage as their income changes. Whether the differences in results are due to the different methodologies or different data sets is not generally known.

While most of the studies look at the impact of Medicaid on private insurance, one study examined whether areas with greater uncompensated care provision had less private insurance coverage (Rask and Rask, 2000). Rask and Rask found significant crowdout from these programs.

Crowding out might result from individual decisions to drop coverage or employer decisions to increase cost sharing or perhaps drop coverage entirely. Two studies (Cutler and Gruber, 1996a, and Shore-Sheppard, Buchmueller, and Jensen, 2000) have considered this question. Although the effects of Medicaid generosity on cost-sharing and offering care are imprecisely estimated (it is hard to learn about firm behavior with existing data), both studies suggest that crowding out is a function of employee decisions to drop coverage more than employer decisions to limit or cancel their insurance.

The magnitude of crowding out bears directly on welfare loss from the tax exclusion of employer-provided health insurance. The analysis above highlighted the welfare loss from excessive moral hazard. The crowdout evidence suggests a countervailing benefit of the subsidy: it offsets other incentives to switch to public insurance. No studies have estimated how the welfare gain from minimizing crowdout compares to the welfare loss from excessive moral hazard.

IX.4 Medicaid Expansions and Other Behaviors

Crowdout is not the only behavior that may be affected by the Medicaid expansions. The expansions increased the ability of women to work and still retain health benefits, and allowed

women to be married and still collect benefits. It also reduced the need for precautionary savings in the event a person became sick. A smaller body of research has examined the empirical import of these effects. In the interests of space, I do not review this literature at length; Gruber (2000) and Krueger and Meyer (2000) provide detailed summaries.

By allowing women to collect health benefits at higher levels of income, the Medicaid expansions increased incentives for women to work. This should result in increased employment and lower welfare participation among this group of the population. Several studies have addressed this issue empirically. Yelowitz (1995), using the cross-state time series methodology described above, found significant evidence that labor supply increased with the expansions. He estimated that increasing the income cutoff for eligibility by 25 percent of the poverty level increased labor force participation among low income women by 3 percentage points. Meyer and Rosenbaum (2000) find counter evidence, however. Using the same methodology but a slightly different measure of eligibility, they find no evidence that labor supply increased after the expansions. Ham and Shore-Sheppard (1999) find evidence that Medicaid expansions led some women to leave welfare for work. Thus, the overall evidence on welfare and work decisions is mixed.

Less evidence has been directed at how Medicaid expansions affect marriage, fertility, and savings. Yelowitz (1998) finds that the Medicaid expansions increased the share of women who got married, consistent with the expansion of coverage to dual-parent families. Joyce, Kaestner, and Kwan (1998) find that Medicaid increases fertility rates, presumably by making the cost of birth and subsequent medical care cheaper. The increase in fertility comes about largely as a result of reduced abortions (Joyce and Kaestner, 1996). Finally, Gruber and Yelowitz (1999) present evidence that savings falls by 16 percent in families made eligible for Medicaid, consistent with reduced need for precautionary savings. The research on all of these issue is just beginning, however.

IX.5 Medicaid Expansions and Health Outcomes

The primary goal of the Medicaid expansions was to improve the health of the poor. Thus, they ultimatley need to be evaluated along that margin. Several studies, shown in Table 11, have estimated the health impacts of Medicaid expansions.

The evidence suggests the health benefits are relatively modest. Piper et al. (1990), Haas et al. (1993), and Joyce (1999) look at the effect of Medicaid expansions on health in particular states or cities – Tennessee, Massachusetts, and New York City respectively. The first two studies find no impact of the expansions on health; Joyce finds a modest positive impact. Other studies have taken a national approach. Currie and Gruber (1996a, b) and Kaestner, Joyce, and Racine (2001) use the cross-state and time series methodology described above to evaluate the health impacts of the Medicaid expansions. Currie and Gruber find small but statistically significant improvements in health following the Medicaid expansions. Kaestner et al. find weak, if any, support for the hypothesis of improved health.

Even relatively modest health benefits might be worth it if the value of life is high. Only one study has explicitly done a cost-effectiveness analysis for the Medicaid expansions (Currie and Gruber, 1996a). Currie and Gruber estimate that the Medicaid expansions had a cost-effectiveness ratio of roughly $1 million per life, considering only the mortality impact. While this is relatively high, in comparison to the Viscusi (1993) summary of the value of a life ($3 million to $7 million for a middle-aged person), the Medicaid expansions seem to be worth it. Thus, at least some studies find that the Medicaid expansions did have a positive benefit in mortality impacts alone, although the rate of return is not enormously high.

Some explanation for why the health benefits are not larger is provided by Piper et al. (1990). They show that many women did not enroll in Medicaid for prenatal care until very late in the

pregnancy – often at the time of delivery. Thus, they were missing much of the prenatal care that may have the highest cost-effectiveness ratio (Institute of Medicine, 1985). This may be a result of the incremental nature of the program: information about program eligibility may only diffuse over time, and eligibility rules are complex. A universal system might increase utilization of services more.

The finding of very late use of services, in turn, suggests an important reason why the estimated cost-effectiveness analysis presented above may be understated. The Medicaid expansions provided hospitals with additional revenue they would not otherwise have had – the reimbursement for a delivery that used to be uncompensated. To the extent that these revenue increases led hospitals to provide high quality care more generally, the benefits of this additional care for health should be accounted for as a benefit fo the expansions. Only one study has traced how the Medicaid funds were used. Duggan (2000) shows that hospitals receiving a large amount of money from the Disproportionate Share Hospital Program (DSH) of Medicaid generally saved those funds in the short-term, adding them to balance sheet assets. It will be important to trace through the effects of these funds over time. If used well, it may be that public programs have a more favorable benefit-cost analysis than the individual calculations suggest.

X. Intergenerational Aspects of Medical Care

While most analysis has focused on the intragenerational aspects of medical care programs, there are intergenerational consequences to these programs as well. Public medical care systems are almost always financed on a pay-as-you-go basis. Medicare in the United States, for example, is predominantly pay as you go, with a small surplus currently but the prospect of large deficits

looming.

Pay as you go systems involve substantial intergenerational transfers. Generations alive when these systems were created or when the benefits expanded rapidly receive large benefits, while future generations bear the cost. A few studies in the literature have attempted to estimate the magnitude of these intergenerational transfers (Steuerle and Bakija, 1997; United States Congressional Budget Office, 1997; Gokhale and Kotlikoff, 1999; Cutler and Sheiner, 2000). Most of this research has focused on the intergenerational aspects of the Medicare program in the United States.

Figure 14, taken from Cutler and Sheiner (2000) presents the most recent set of estimates. Cohorts born around 1920, and thus reaching Medicare eligibility around 1985, are expected to receive net benefits of over $60,000 from Medicare. Cohorts born today are expected to pay more into the system than they receive out. The rates of return are also high for older cohorts. The 1910 cohort is expected to receive a rate of return of over 25 percent, compared to 2.2 percent for cohorts born in 1980.[63]

These estimates use the assumptions of the Medicare actuaries, which project that medical cost increases will slow down in the next 25 years to the growth rate of the economy as a whole. Young cohorts today therefore pay for the rapid cost growth experienced by older cohorts but do note receive benefits from rapid growth themselves. An alternative projection allowing medical cost growth to continue avoids the very large losses for current young populations. But these groups still fare worse than the cohorts that were elderly or near elderly when the program was implemented.

[63] Rates of return are extremely high for the very oldest cohorts because they paid so little into the system but get a lot out. For this reason, we do not report rates of return for cohorts prior to those born in 1910.

Appropriate government policy towards this intergenerational distribution is a broader question than just Medicare policy, involving issues of savings and labor market behavior, among other behaviors. I do not pursue these issues at length here.

XI. Conclusions

As this brief (!) tour through the health sector indicates, the public policy issues raised by health care are vast. I conclude by highlighting what has been learned and providing some direction for future research.

At the most basic level, governments are involved in what people do to themselves – smoking and drinking on the bad side, exercise and eating well on the good. One concern about such behaviors is the externalities they impose; financial and health consequences need to be considered. 'Internalities' may be important as well; there are many reasons to think smokers themselves would be better off if induced not to smoke. The literature has made substantial progress on the externality question, but much less progress has been made on the internality question. Since the potential magnitude of internal damages dwarfs the magnitude of external damages, more research on this question is a clear priority.

Once an individual becomes sick, the medical system takes over. Governments face a first choice about how to provide medical services: through the public or private sector. The answer is complex. Private firms respond to incentives more rapidly than public firms, but the incentives need to be the right ones for the system to be efficient. The wealth of different delivery systems in the United States and abroad creates a host of experimental situations to help judge the appropriate delivery system for medical care. Empirical research on this question is a clear need.

In every country, the government is involved in influencing the health insurance that people receive. In designing such policies, the second best is the goal. More generous insurance increases the gains from risk sharing but also the losses from moral hazard. The optimal policy balances the marginal insurance gains against the marginal moral hazard losses. An individual in isolation designing such a policy for himself would get the tradeoff right. But government may be involved where it is not warranted. By subsidizing employer-provided insurance at the expense of out-of-pocket spending, the Federal government in the United States encourages more generous insurance, and perhaps too much moral hazard. The 'perhaps' is key, however; the tax benefits of insurance may encourage valuable innovation, may offset other public subsidies encouraging people to be uninsured, or may encourage risk pooling at the expense of adverse selection. Understanding the total impact of the tax subsidy through all of these channels is still to be done.

Putting health insurance in a market creates even more problems. People with different health risks want different insurance plans; low risks will not voluntarily subsidize high risks. As a result, the market will attempt to segregate the two groups, either explicitly (by charging high risks more than low risks) or implicitly (by encouraging low risks to move to less generous plans to avoid the high risks). The problems from such attempts are three-fold: the less healthy will pay more for insurance the healthy, denying people the *ex ante* risk pooling that they would want; people are encouraged to join plans that are less generous than they would prefer if they faced actuarially fair prices, because such switching saves them from subsidizing the high risks; and plans will have incentives to make their policies less generous, so as to discourage high risks from enrolling.

At the extreme, governments may respond to these problems by mandating insurance in a common plan at a common price. Short of this, the government might enact regulatory barriers to segregation or put in place financial incentives for the sick and healthy to remain together.

Empirical evidence on the effects of these policies is not entirely clear; policy action is now awaiting such knowledge.

Finally, governments are involved in distributional issues for the poor, as they always are. Equity in health care is valued more than equity in most other markets; as the saying goes, health care is a right and not a good. Equity is a bigger problem in countries without universal coverage than in those with universal coverage; the United States struggles with equity more than most other developed countries. In recent years, the United States has had incremental expansions of coverage for the poor. These programs have been effective, but marginally so. The costs are high and the benefits only modest. Learning how to design such programs is a key question facing the public sector. This question is particularly pressing because medical care markets are changing so rapidly. The rise of managed care and cutbacks in government payments are squeezing profits from medical care providers. The impact these policies will have on the implicit subsidy system for the poor is worrisome.

Some evidence of the sheer diversity of opinion about public policy for health care is provided by the recent debate about Medicare in the United States. Some look at Medicare and see an inefficient, government-provided insurance system. Thus, one contingent supports a voucher system in the hopes that plan competition will eliminate wasteful spending from the program (Aaron and Reischauer, 1995). A second group considers the lack of adequate benefits the major problem with Medicare. The poor elderly are faced with high cost sharing, and those without employer-provided supplemental insurance or Medicaid are often uninsured for prescription drugs. Thus, this group favors expanding the Medicare package and promoting increased service use (Moon, 1996). Finally, some see the high and rising cost of Medicare as the central problem. Increased Medicare spending worsens the Federal budget and reduces national saving. Thus, a third group favors

shifting the costs of the current system to the elderly, or forcing middle aged people to save more for medical care needs when they are retired (Gokhale and Kotlikoff, 1999; Feldstein, 1999). Each of these positions is credible in its own right, but the solutions are diametrically opposed. In perhaps no other area of public finance is the range of differing policy prescriptions so great.

This broad range of questions demands serious research attention. Which direction should policy go? What are the next steps? This chapter provides an outline, but only that.

References

Aaron, H. J., and R. D. Reischauser (1995), "The Medicare Reform Debate: What Is The Next Step?" *Health Affairs*, 14:8-30.

Akerlof, G. (1978), "The Economics of Tagging as Applied to the Optimal Income Tax", *American Economic Review*, 68:8-19.

Altman, D., D. M. Cutler and R. J. Zeckhauser, (1998), "Adverse Selection and Adverse Retention," *American Economic Review*, Vol. 88, No. 2, pp. 122-26.

Arrow, K. (1963), "Uncertainty and the Welfare Economics of Medical Care," *American Economic Review* 53(5), 941-973.

Arrow, K. (1965), *Aspects of the Theory of Risk Bearing* (Helsinki: Yrjo Jahnssonin Saatio).

Auerbach, A. and J. Hines (2001), "Taxation and Economic Efficiency", In: A. Auerbach and M. Feldstein, eds., Handbook of Public Economics, Volume 3 (Amsterdam: Elsevier).

Beck, R. G., (1974), "The Effects of Co-Payment on the Poor," *Journal of Human Resources*, Vol. 9, No. 1, pp. 129-142.

Becker, G. S., and K. M. Murphy (1988), "A Theory of Rational Addiction," *Journal of Political Economy* 96: 675-700.

Becker, G. S., M. Grossman, and K. M. Murphy (1994), "An Empirical Analysis of Cigarette Addiction," *American Economic Review* 84:396-418.

Besley, T. and M. Gouveia (1994), "Alternative Systems of Health Care Provision," *Economic Policy: A European Forum* 9:199-249.

Bhattacharya, J., W. B. Vogt, A. Yoshikawa and T. Nakahara, (1996), "The Utilization of Outpatient Medical Services in Japan," *Journal of Human Resources*, Vol. 31, No. 2, pp. 450-76.

Bice, T. W., (1975), "Risk Vulnerability and Enrollment in a Prepaid Group Practice," *Medical Care*, Vol. 13, No. 8, pp. 698-703.

Blomqvist, A. G. (1997), "Optimal Non-linear Health Insurance," *Journal of Health Economics* 16:303-21.

Blomqvist, A. G., and P. Johansson (1997), "Economic Efficiency and Mixed Public/Private Insurance," *Journal of Public Economics* 66:505-16.

Blumberg, L. J., L. Dubay, and S. A. Norton (2000), "Did the Medicaid Expansions for Children Displace Private Insurance? An Analysis Using the SIPP," *Journal of Health Economics* 19:33-60.

Bovenberg, A. L. and L. Goulder, (2001). "Environmental Taxation and Regulation", In. A. Auerbach and M. S. Feldstein, eds., *Handbook of Public Economics*, Vol. 4 (Amsterdam: Elsevier).

Brown, R. S., et al., (1993), *The Medicare Risk Program for HMOs -- Final Summary Report on Findings from the Evaluation*, Final Report under HCFA Contract Number 500-88-0006 (Princeton, NJ: Mathematica Policy Research, Inc.,)

Buchanan, J. L., E. B. Keeler, J. E. Rolph and M. R. Holmer, (1991), "Simulating Health Expenditures Under Alternative Insurance Plans," *Management Science* Vol. 37, No. 9, pp. 1067-89.

Buchmueller, T. and J. DiNardo (forthcoming), "Did Community Rating Induce and Adverse Selection Death Spiral? Evidence from New York, Pennsylvania and Connecticut," *American Economic Review*.

Buchmueller, T. C., and P. J. Feldstein (1997), "The Effect of Price on Switching Among Health Plans," *Journal of Health Economics* 16:231-47.

Buchmueller, T. C., and G. A. Jensen (1997),"Small Group Reform in a Competitive Managed Care Market: The Case of California, 1993 to 1995," *Inquiry* 34:249-63.

Burchardt, T., J. Hills, and C. Proper (1999). *Public Welfare and Public Policy*, (York: Joseph Rountree Foundation).

Cardon, J. and I. Hendel, (2001), "Asymmetric Information in Health Care and Health Insurance Markets: Evidence from the National Medical Expenditure Survey," *Rand Journal of Economics*, 32:408-427.

Chaloupka, F. (1991), "Rational Addictive Behavior and Cigarette Smoking," *Journal of Political Economy* 99:722-42.

Chaloupka, F. and K. E. Warner (2000), "The Economics of Smoking," in A. Culyer and J. Newhouse, eds., *Handbook of Health Economics*, Volume 1(B), (North Holland, Amsterdam) 1539-1627.

Cherkin, D. C., L. Grothaus and E. H. Wagner, (1989), "The Effect of Office Visit Copayments on Utilization in a Health Maintenance Organization," *Medical Care*, Vol. 27, No. 7, pp. 669-79.

Chernew, M., K. Frick, and C. G. McLaughlin (1997), "The Demand for Health Insurance Coverage by Low-Income Workers: Can Reduced Premiums Achieve Full Coverage?" *Health Services Research,* 32:453-70.

Chernew, M., and K. Frick (1999), "The impact of managed care on the existence of equilibrium in health insurance markets", *Journal Of Health Economics*, 18:573-592.

Chernick, H. A., M. R. Holmer, and D. H. Weinberg (1987), "Tax Policy toward Health Insurance and the Demand for Medical Services," *Journal of Health Economics* 6:1-25.

Christensen, S. and J. Shinogle (1997), "Effects of Supplemental Coverage on Use of Services by Medicare Enrollees," *Health Care Financing Review,* 5-17.

Cochrane, J., (1995), "Time Consistent Health Insurance," J*ournal of Political Economy* 103 (3), 445-73.

Colle, A. D. and M. Grossman, (1978), "Determinants of Pediatric Care Utilization," *Journal of Human Resources*, Vol. 13, pp. 115-53.

Conrad, D. A., D. Grembowski and P. Milgrom, (1985), "Adverse Selection Within Dental Insurance Markets, *Advances in Health Economics and Health Services Research*, Vol. 6, Richard M. Scheffler and Louis F. Rossiter, eds. (Greenwich, CT: JAI Press), 171-90.

Cook, P. J. and M. Moore (2000), "Alcohol," in A. Culyer and J. Newhouse ed., *Handbook of Health Economics*, Volume 1B, (North Holland, Amsterdam) 1629-1673.

Culyer, A. and J. P. Newhouse (2000a), *Handbook of Health Economics*. Vol. 1A (North Holland, Amsterdam)

Culyer, A. and J. P. Newhouse (2000b), *Handbook of Health Economics*. Vol. 1B (North Holland, Amsterdam).

Currie, J. and J. Gruber (1996a), "Saving Babies: The Efficacy and Cost of Recent Changes in the Medicaid Eligibility of Pregnant Women," *Journal of Political Economy* 104:1263-96.

Currie, J. and J. Gruber (1996b), "Health Insurance Eligibility, Utilization of Medical Care, and Child Health," *Quarterly Journal of Economics* 111:431-66.

Currie, J. and J. Gruber (1997), "The Technology of Birth: Health Insurance, Medical Interventions, and Infant Health," NBER Working Paper No. 5985.

Cutler, D. M., (1996), "Why Don't Markets Insure Long-Term Risk," mimeo, Harvard University.

Cutler, D. M. (2000), "Supplementing Public Insurance Coverage with Private Insurance Coverage: Implications for Medical Care Systems", mimeo, Harvard University.

Cutler, D. M. (2001), "Equality, Efficiency, and Market Fundamentals: The Dynamics of International Medical Care Reform," mimeo.

Cutler, D. M., A.M. Epstein, R.G. Frank, R. Hartman, C. King III, J. P. Newhouse, M. B. Rosenthal, and E. R. Vigdor (2000) "How Good a Deal Was the Tobacco Settlement: Assessing Payments to Massachusetts," *Journal of Risk and Uncertainty*, 21:235-261.

Cutler, D. M. and J. Gruber (1996a), "Does Public Insurance Crowd Out Private Insurance?" *Quarterly Journal of Economics* 111:391-430.

Cutler, D. M. and J. Gruber (1996b), "Medicaid Crowd Out and the Inverse Bind: Response to Editorial," *Inquiry* 33:9.

Cutler, D. M. and J. Gruber (1996c), "The Effect of Medicaid Expansions on Public Insurance, Private Insurance, and Redistribution," *American Economic Review* 86:378-83.

Cutler, D. M., J. Gruber, R. S. H., M. B. Landrum, J. P. Newhouse, and M. Rosenthal (2002), "The Economic Impacts of the Tobacco Settlement," *Journal of Policy Analysis and Management*, 21:1-19.

Cutler, D. M., and J. Horwitz (1999), "Converting Hospitals from Not-for-Profit to For-Profit Form: Why and What Effects?" In: D. Cutler, ed., The Changing Hospital Industry: Comparing Not-for-Profit and For-Profit Institutions (Chicago: University of Chicago Press).

Cutler, D. M. and R. Johnson (2001), "The Birth of the Social Insurance State," mimeo, Harvard University.

Cutler, D. M., and M. McClellan (2001), "Is Technological Change in Medicine Worth It?", *Health Affairs*, 20:11-29.

Cutler, D. M., and S. J. Reber (1998), "Paying for Health Insurance: The Trade-Off between Competition and Adverse Selection," *Quarterly Journal of Economics* 113:433-66.

Cutler, D. M., and E. Richardson (1997), "Measuring the Health of the U. S. Population," *Brookings Papers on Economic Activity*, Microeconomics, 217-271.

Cutler, D. M., and L. M. Sheiner (2000), "Generational Aspects of Medicare", *American Economic Review, Papers and Proceedings*, 90: 303-307.

Cutler, D. M. and R. J. Zeckhauser, (1998), "Adverse Selection in Health Insurance," *Frontiers in Health Policy Research*, Vol. 1, Alan Garber, ed. (Cambridge, MA: MIT Press).

Cutler, D. M. and R. J. Zeckhauser, (2000), "The Anatomy of Health Insurance" In: A. Culyer and J. Newhouse, eds., *Handbook of Health Economics, Volume 1A* (Amsterdam: Elsevier).

Dafny, L. and J. Gruber (forthcoming), "Does Public Insurance Improve the Efficiency of Medical Care? Medicaid Expansions and Avoidable Hospitalizations", *Journal of Public Economics*.

Darby, M. R. and E. Karni (1973), "Free Competition and the Optimal Amount of Fraud", *Journal of Law & Economics.*16:67-88.

Davis, K. and L. B. Russell, (1972), "The Substitution of Hospital Outpatient Care for Inpatient care," *Review of Economics and Statistics*, Vol. 54, No. 2, pp. 109-120.

Deaton, A. (2001), "Relative Deprivation, Inequality, and Mortality," *NBER Working Paper*, No. 8099.

de Meza, D., (1983), "Health Insurance and the Demand for Medical Care," *Journal of Health Economics*, Vol. 2 (1), 47-54.

Dowd, B. and R. Feldman, (1985), "Biased Selection in Twin Cities Health Plans," *Advances in Health Economics and Health Services Research*, Vol. 6, Richard M. Scheffler and Louis F. Rossiter, eds. (Greenwich, CT: JAI Press) pp. 253-71.

Dowd, B. and R. Feldman (1994), "Premium Elasticities of Health Plan Choice," *Inquiry* 31:438-44.

Dubay, L. C., and G. M. Kenney (1996), "The Effects of Medicaid Expansions on Insurance Coverage of Children," *The Future of Children* 6:152-161.

Dubay, L. C. and G. M. Kenney (1997), "Did Medicaid Expansions for Pregnant Women Crowd Out Private Coverage?" *Health Affairs* 16:185-93.

Dubay, L. C., S. A. Norton, and M. Moon (1995), "Medicaid Expansions for Pregnant Women and Infants: Easing Hospitals' Uncompensated Care Burdens?" *Inquiry* 32:332-44.

Duggan, M (1999). "Hospital Ownership and Public Medical Spending", *The Quarterly Journal of Economics.* 115:1343-73.

Eggers, P. W. (1980), "Risk Differential Between Medicare Beneficiaries Enrolled and Not Enrolled in an HMO," *Health Care Financing Review*, Vol. 1, pp. 91-99.

Eichner, M. J., (1998), "Incentives, Price Expectations and Medical Expenditures: An Analysis of Claims Under Employer-Provided Health Insurance," mimeo.

Ellis, R. P. (1985), "The Effect of Prior-Year Health Expenditures on Health Coverage Plan Choice," *Advances in Health Economics and Health Services Research*, Vol. 6, Richard M. Scheffler and Louis F. Rossiter, eds. (Greenwich, CT: JAI Press) pp. 127-47.

Ellis, R. P., (1989), "Employee Choice of Health Insurance," *Review of Economics and Statistics*, Vol. 71, No. 2 pp. 215-23.

Ettner, S. (1997), "Adverse Selection and the Purchase of Medigap Insurance by the Elderly," *Journal of Health Economics,* 16: 543-562.

Evans, W., J. S. Ringel, and D. Stech (1999). "Tobacco Taxes and Public Policy to Discourage Smoking". In: J. Poterba, ed., *Tax Policy and the Economy*, Volume 13, (Cambridge, MA: MIT Press).

Farley, P. J. and A. C. Monheit, (1985), "Selectivity in the Demand for Health Insurance and Health Care," *Advances in Health Economics and Health Services Research*, Vol. 6, Richard M. Scheffler and Louis F. Rossiter, eds. (Greenwich, CT: JAI Press), pp. 231-52.

Feldman, R. and Dowd, B., (1991), "Must Adverse Selection Cause Premium Spirals," *Journal of Health Economics,* 10:350-357.

Feldman, R., B. Dowd, S. Leitz, and L. A. Blewett (1997), "The Effect of Premiums on the Small Firm's Decision to Offer Health Insurance," *Journal of Human Resources* 32:635-58.

Feldman, R., M. Finch, B. Dowd, and S. Cassou (1989), "The Demand for Employment-Based Health Insurance Plans," *Journal of Human Resources* 24:115-42.

Feldstein, M. S., (1970), "The Rising Price of Physicians' Services," *Review of Economics and Statistics*, Vol. 52, No. 2, pp. 121-33.

Feldstein, M. S., (1970), "Hospital Cost Inflation: A Study of Nonprofit Price Dynamics," *American Economic Review*, Vol. 60 (1971), pp. 853-72.

Feldstein, M. S., (1971), "Hospital Cost Inflation: A Study of Nonprofit Price Dynamics," *American Economic Review*, Vol. 60 pp. 853-72.

Feldstein, M. S. (1973), "The Welfare Loss of Excess Health Insurance," *Journal of Political Economy* 81:251-80.

Feldstein, M. S. (1999), "Prefunding Medicare", *American Economic Review, Papers and Proceeding*, 89: 222-227.

Feldstein, M. S. and B. Friedman, (1977), "Tax Subsidies, the Rational Demand for Insurance and the Health Care Crisis," *Journal of Public Economics*, Vol. 7, No. 2 pp. 155-78.

Feldstein, P. J., (1964) "General Report," *Report of the Commission on the Cost of Medical Care* (Chicago: American Medical Association, Part 1).

Finkelstein, A. (forthcoming), "The Effect of Tax Subsidies to Employer-Provided Supplementary Health Insurance: Evidence from Canada," *Journal of Public Economics*.

Fisher, E., J. Skinner, and J. Wennberg, "The Efficiency of Medicare", mimeo, Dartmouth College.

Fuchs, V. R. and M. J. Kramer, (1972), "Determinants of Expenditures for Physicians' Services in the United States, 1948-68," *National Bureau of Economic Research Occasional Paper Series*, No. 117.

Fuchs, V. R. (1996), "Economics, Values, and Health Care Reform", *American Economic Review*, 86: 1-24.

Gentry, W. M., and E. Peress (1994), "Taxes and Fringe Benefits Offered by Employers," *NBER Working Paper* 4764.

Glaeser, E. and A. Shleifer (2001), "Not-for-profit Entrepreneurs", *Journal of Public Economics*, 81:99-115.

Glantz, S. and W. W. Parmley (1995), Passive Smoking and Heart Disease: Mechanisms and Risk. *Journal of the American Medical Association.* 273:1047-1053.

Glied, Sherry (2000)., "Managed Care," In: A. Culyer and J. Newhouse, eds., *Handbook of Health Economics, Volume 1A* (Amsterdam: Elsevier).

Globerman, S. and A. Vining (1998), "A Policy Perspective on `Mixed' Health Care Financial Systems of Business and Economics," *Journal of Risk and Insurance* 65:57-80.

Gokhale J. and L. J. Kotlikoff (1999). "Medicare from the Perspective of Generational Accounting", In: A. Redelmeyer and T. Saving, eds., *Medicare Reform: Issues and Answers*, (Chicago: University of Chicago Press), 153-174.

Goldman, F. and M. Grossman, (1978), "The Demand for Pediatric Care: An Hedonic Approach," *Journal of Political Economy*, Vol. 86, No. 2, pp. 259-80.

Gouveia, M. (1997). "Majority Rule and the Public Provision of a Private Good." *Public Choice.* 93:221-44.

Griffith, M., N. Baloff and E. L. Spitznagel, (1984), "Utilization Patterns of Health Maintenance Organization Disenrollees," *Medical Care*, Vol. 22, No. 9, pp. 827-34.

Grossman, H. (1979). "Adverse selection, dissembling, and competitive equilibrium." *The Bell Journal of Economics,* 10:336–343

Grossman, M., F. J. Chaloupka, and I. Sirtalan (1998), "An Empirical Analysis of Alcohol Addiction: Results from Monitoring the Future Panels", *Economic Inquiry*, 36:39-48.

Gruber, J. (2000), "Health Insurance and the Labor Market". In: A. Culyer and J. Newhouse, eds., *Handbook of Health Economics, Volume* 1, (Amsterdam: Elsevier).

Gruber, J. (forthcming), "Medicaid," In: R. Moffitt, ed., *Means Tested Transfer Programs in the United States*, (Chicago: University of Chicago Press).

Gruber, J. and B. Koszegi (2001), "Is Addiction 'Rational': Theory and Evidence," *Quarterly Journal of Economics*, 116:1261-1304.

Gruber, J. and J. M. Poterba (1994), "Tax Incentives and the Decision to Purchase Health Insurance: Evidence from the Self-Employed," *Quarterly Journal of Economics* 109:701-33.

Gruber, J. and J. M. Poterba (1996), "Tax Subsidies to Employer-Provided Health Insurance," in: J. M. Poterba and M. Feldstein eds., *Empirical Foundation of Household Taxation* (University of Chicago Press, Chicago).

Gruber, J., and A. Yelowitz (1999). Public Health Insurance and Private Savings. *Journal of Political Economy.* 107:1249-74.

Haas, J. S., S. Udvarhelyi, and A.M. Epstein (1993), "The Effect of Health Coverage For Uninsured Pregnant Women on Maternal Health and The Use of Cesarean Section," *Journal of the American Medical Association* 270:61-4.

Hall, M. (2000), “The Impact of Health Insurance Market Reforms on Market Competition”, *American Journal of Managed Care,* 6:57.

J. Ham and L. Shore-Sheppard (1999), “The Effect of Medicaid Expansions for low Income Children on Medicaid Participation and Insurance Coverage: Estimates from the SIPP”, mimeo, Williams College.

Hansmann, H. (1980). “The Role of Nonprofit Enterprise”, *Yale Law Journal*, 89:835-901.

Hart, O., A. Shleifer, and R. Vishny (1997), “The Proper Scope of Government: Theory and an Application to Prisons.. [Journal Article] *The Quarterly Journal of Economics.* 112:1127-61.

Helms, W. D., A. K. Gauthier, and D. M. Campion (1992), "Mending the Flaws in the Small-Group Market," *Health Affairs*, Summer 11:7-27.

Hing, E., and G. A. Jensen (1999), "Health Insurance Portability and Accountability Act of 1996: Lessons from the States,” *Medical Care* 37:692-705.

Holmer, M. (1984), “Tax Policy and the Demand for Health Insurance,” *Journal of Health Economics* 3:203-21.

Hubbard, R. G. and K. Hassett (1999). “Noncontractible Quality and Organizational Form in the US Hospital Industry”, mimeo, Columbia University.

Institute of Medicine (1985). *Preventing Low Birthweight*, (Washington, D.C.: Institute of Medicine).

Jackson-Beeck, M. and J. H. Kleinman, (1983), “Evidence for Self-Selection Among Health Maintenance Organization Enrollees,” *Journal of the American Medical Association*, Vol. 250, No. 20, pp. 2826-29.

Jensen, G. A., and M. A. Morrisey (1999), “Small Group Reform and Insurance Provision by Small Firms, 1989-1995,” *Inquiry* 36:176-87.

Joyce, T. (1999), “Impact of Augmented Prenatal Care on Birth Outcomes of Medicaid Recipients in New York City,” *Journal of Health Economics* 18:31-67.

Joyce, T. R. Kaestner, and F. Kwan (1998), “Is Medicaid Pronatalist? Effects of the Medicaid Eligibility Expansions on Abortions and Births.” *Family Planning Perspectives*, 30:108-113.

Joyce, T., and R. Kaestner (1996). "The Effect of Medicaid Income Eligibility Expansions on Abortion." *Demography* 30:181-192.

Juba, D. A., J. R. Lave and J. Shaddy, (1980), "An Analysis of the Choice of Health Benefits Plans," *Inquiry*, Vol. 17, pp. 62-71.

Kaestner, R., T. Joyce, and A. Racine (2001), "Medicaid Eligibility and the Incidence of Ambulatory Care Sensitive Hospitalizations for Children." *Social Science and Medicine*. 52:305-313.

Kaiser Family Foundation and Health Research and Educational Trust (2000). *Employer Health Benefits*. (Washington, D.C.: Henry J. Kaiser Family Foundation).

Kapur, K. (2000a), "Labor Market Implications of State Small Group Health Insurance Reform", mimeo, Rand Corporation.

Kapur, K. (2000b), "The Impact of the Health Insurance Market on Small Firm Employment", mimeo, Rand Corporation.

Keenan, P., M. Beeuwkes-Buntin, T. McGuire, and J. Newhouse, (2001). "The Prevalence of Formal Risk Adjustment in Health Plan Purchasing", *Inquiry*, 38:245-259.

Kenkel, D. S. (1996), "New Estimates of the Optimal Tax on Alcohol," *Economic Inquiry* 34:296-319.

Kotowitz, Y. (1987), "Moral Hazard," in the *New Palgrave Dictionary of Economics.*

Krueger, A. and B. Meyer (2002), "Social Insurance and Labor Supply", In: A. Auerbach and M. Feldstein, eds., *Handbook of Public Economics, Volume 4*, (Amsterdam: Elsevier).

Krupnick, A., A. Alberini, M. Cropper, N. Simon, B. O'Brien, R. Goeree, and M. Heintzelman (2000), "Age, Health, and the Willingness to Pay for Mortality Risk Reductions: A Contingent Valuation Survey of Ontario Residents," mimeo, Resources for the Future.

Laibson, D. (1997), "Golden Eggs and Hyperbolic Discounting," Quarterly Journal of Economics 112:443-77.

Langwell, K. M. and J. P. Hadley, (1989), "Evaluation of the Medicare Competition Demonstrations," *Health Care Financing Review*, Vol. 11, No. 2, pp. 65-80.

Laux, F. L. (2000), "Addiction as a Market Failure: Using Rational Addiction Results to Justify Tobacco Regulation," *Journal of Health Economics* 19:421-37.

Leibowitz, A., and M. Chernew (1992), "The Firm's Demand for Health Insurance", in *Health Benefits and the Workforce,* 77-83 (Washington, D.C.: U.S. Department of Labor).

Long, S. H., R. F. Settle and C. W. Wrightson, (1988), "Employee Premiums, Availability of Alternative Plans, and HMO Disenrollment," *Medical Care,* Vol. 26, No. 10, pp. 927-38.

Luft, H. S., J. B. Trauner and S. C. Maerki, (1985), "Adverse Selection in a Large, Multiple-Option Health Benefits Program: A Case Study of the California Public Employees' Retirement System," *Advances in Health Economics and Health Services Research*, Vol. 6, Richard M. Scheffler and Louis F. Rossiter, eds. (Greenwich, CT: JAI Press) pp. 197-229.

Maibach, E., K. Dusenbury, P. Zupp, et al., (1998), "Marketing HMOs to Medicare Beneficiaries: An Analysis of Four Medicare Markets," Menlo Park, CA: Kaiser Family Foundation.

Manning, W. G. and M. S. Marquis, (1996), "Health Insurance: The Tradeoff Between Risk Pooling and Moral Hazard," *Journal of Health Economics*, Vol. 15, No. 5 pp. 609-39.

Manning, W. G., E. B. Keeler, J. P. Newhouse, E. M. Sloss, and J. Wasserman (1989), "The Taxes of Sin. Do Smokers and Drinkers Pay Their Way?" *Journal of the American Medical Association* 261:1604-9.

Manning, W. G., E. B. Keeler, J. P. Newhouse, E. M. Sloss, and J. Wasserman (1991), *The Costs of Poor Health Habits* (Harvard University Press, Cambridge).

Marquis, M. S. (1992), "Adverse Selection with a Multiple Choice Among Health Insurance Plans: A Simulation Analysis," *Journal of Health Economics*, Vol. 11, No. 2, pp. 129-51.

Marquis, M. S. and S.H. Long (1995), "Worker Demand for Health Insurance in the Non-Group Market," *Journal of Health Economics* 14:47-63.

Marquis, M. S. and S.H. Long (2001), "To Offer or Not to Offer: The Role of Price in Employers' Health Insurance Decisions", *Health Services Research*, 36.

Marquis, M. S. and C. E. Phelps (1987), "Price Elasticity and Adverse Selection in the Demand for Supplementary Health Insurance," *Economic Inquiry* 25:299-313.

Marsteller, J. A., L. M. Nichols, A. Badawi, B. Kessler, S. Rajan, and S. Zuckerman (1998), "Variations in the Uninsured: State and County Results", mimeo, Urban Institute.

McAvinchey, I. D. and A. Yannopoulos, (1993), "Elasticity Estimates from a Dynamic Model of Interrelated Demands for Private and Public Acute Health Care," *Journal of Health Economics*, Vol. 12, pp. 171-86.

McGuire, T. G., (1981), "Price and Membership in a Prepaid Group Medical Practice," *Medical Care*, Vol. 19, No. 2, pp. 172-83.

Merrill, J., C. Jackson and J. Reuter, (1985), "Factors That Affect the HMO Enrollment Decision: A Tale of Two Cities," *Inquiry*, Vol. 22, pp. 388-95.

Meyer, B. D. and D. T. Rosenbaum (2000). "Medicaid, Private Health Insurance, and the Labor Supply of Single Mothers", mimeo, Northwestern University.

Mirrlees, J. (1971), "An Exploration in the Theory of Optimum Income Taxation. *The Review of Economic Studies.* 38:175-208.

Miyazawa, H. (1977), "The Rat Race and Internal Labor Markets." *Bell Journal of Economics,* 8: 394–418.

Moon, M. (1996), *Medicare Now and In The Future*, (Washington, D.C.: The Urban Institute).

Morrisey, M. A., G. A. Jensen, and R. J. Morlock (1994), "Small Employers and the Health Insurance Market," *Health Affairs* 13:149-61.

Newhouse, J. P. (1992), "Medical Care Costs: How Much Welfare Loss?", *Journal of Economic Perspectives*, 6:13-29.

Newhouse, J. P. and C. E. Phelps, (1974), "Price and Income Elasticities for Medical Care Services," *The Economics of Health and Medical Care*, Ch. 9 (New York: John Wiley & Sons), pp. 140-61.

Newhouse, J. P. and C. E. Phelps, (1976), "New Estimates of Price and Income Elasticities of Medical Care Services," *The Role of Health Insurance in the Health Services Sector*, Ch. 7 (New York: National Bureau of Economic Research), pp. 261-313.

Newhouse, J. P. and the Insurance Experiment Group, (1993), *Free for All? Lessons from the RAND Health Insurance Experiment* (Cambridge, MA: Harvard University Press).

Nichols, L. M., and L. J. Blumberg (1998), "A Different Kind of 'New Federalism'? The Health Insurance Portability and Accountability Act of 1996," *Health Affairs* 17:25-42.

Nyman J. (1999), "The Value of Health Insurance: The Access Motive, *Journal Of Health Economics* 18:141-152

Olekalns, N. and P. Bardsley (1996), "Rational Addiction to Caffeine: An Analysis of Coffee consumption", *Journal of Political Economy*, 104:1100-1104.

Orphanides, A. and D. Zervos (1998), Myopia and Addictive Behaviour", *Economic Journal.* 108:75-91

Pauly, M. (1968), "The Economics of Moral Hazard: Comment," *American Economic Review*, 58: 531-536.

Pauly, M. (1974), "Overinsurance and Public Provision of Insurance: The Roles of Moral Hazard and Adverse Selection," *Quarterly Journal of Economics* 88: 44-54.

Pauly, M. (1986), "Taxation, Health Insurance, and Market Failure in the Medical Economy," *Journal of Economic Literature* 24:629-75.

Pauly, M., H. Kunreuther, and R. Hirth, (1995), "Guaranteed Renewability in Insurance," *Journal of Risk & Uncertainty*, Vol. 10 (2), pp. 143-56.

Phelps, C. E. and J. P. Newhouse, (1972), "Effect of Coinsurance: A Multivariate Analysis," *Social Security Bulletin* pp. 20-28.

Phelps, C. E. and J. P. Newhouse, (1974), "Coinsurance, the Price of Time, and the Demand for Medical Services, *Rewivew of Economics and* Statistics, 56:334-342.

Phelps, Charles E., (1973), "The Demand for Health Insurance: A Theoretical and Empirical Investigation," *RAND Research Paper Series*, No. R-1054-OEO.

Piper, J.M., W. A. Ray, and M. Griffin (1990), "Effects of Medicaid Eligibility Expansion on Prenatal Care and Pregnancy Outcome in Tennessee," *Journal of the American Medical Association* 264:2219-2223.

Pogue, T. F. and L. G. Sgontz (1989), "Taxing to Control Social Costs: The Case of Alcohol," *American Economic Review* 79:235-43.

Poterba, J. (1996), "Government Intervention in Markets for Education and Health Care: How and Why", In: V. R. Fuchs, ed., *Individual and Social Responsibility* (Chicago: University of Chicago Press), 277-304.

Preston, S. (1996), "American Longevity: Past, Present, and Future," Syracuse University Policy Brief No. 7/1996. Distinguished Lecturer in Aging Series, Center for Economic Policy Research Policy Brief.

Price, J. R. and J. W. Mays, (1985), "Biased selection in the Federal Employees Health Benefits Program," *Inquiry*, Vol. 22 pp. 67-77.

Propper, C. and K. Green (forthcoming), "A Larger Role for the Private Sector in Health Care? A Review of the Arguments," *Journal of Social Policy.*

Rask, K. N., and K. J. Rask (2000), "Public Insurance Substituting for Private Insurance: New Evidence Regarding Public Hospitals, Uncompensated Care Funds, and Medicaid," *Journal of Health Economics* 19:1-31.

Riley J. (1979), "Informational Equilibrium", *Econometrica.* 47:331-59.

Rodgers, J. and K. E. Smith, (1996), "Is There Biased Selection in Medicare HMOs?" *Health Policy Economics Group Report* (Washington, DC: Price Waterhouse LLP).

Rosett, R. N. and L. Huang, (1973), "The Effect of Health Insurance on the Demand for Medical Care," *Journal of Political Economy*, Vol. 81 pp. 281-305.

Rosenthal, G., (1970), "Price Elasticity of Demand for Short-Term General Hospital Services," *Empirical Studies in Health Economics*, Herbert E. Klarman, ed., (Baltimore, MD: Johns Hopkins Press), pp. 101-117.

Rothschild, M. and J. E. Stiglitz, (1976), "Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information," *Quarterly Journal of Economics* 1976, 90: 629-650.

Royalty, A. B. (2000), "Tax Preferences for Fringe Benefits and Workers' Eligibility for Employer Health Insurance", *Journal of Public Economics*, 75: 209-228.

Royalty, A. B. and N. Solomon (1999), "Health Plan Choice: Price Elasticities in a Managed Competition Setting," *Journal of Human Resources* 34:1-41.

Schoenbaum, M. (1997), "Do Smokers Understand the Mortality Effects of Smoking? Evidence from the Health and Retirement Survey," *American Journal of Public Health* 87:755-759.

Scitovsky, A. A. and N. M. Snyder, (1972), "Effect of Coinsurance on Use of Physician Services," *Social Security Bulletin*, pp. 3-19.

Scitovsky, A. A. and N. McCall, (1977), "Coinsurance and the Demand for Physician Services: Four Years Later," *Social Security Bulletin*, pp. 19-27.

Scitovsky, A. A., N. McCall and L. Benham, (1978), "Factors Affecting the Choice Between Two Prepaid Plans," *Medical Care*, Vol. 16, No. 8, pp. 660-675.

Shleifer, A. (1998). State versus Private Ownership. *Journal of Economic Perspectives.* 12:133-50.

Shore-Sheppard, L. D. (1996), "Stemming the Tide? The Effect of Expanding Medicaid Eligibility on Health Insurance Coverage," mimeo, Princeton University.

Shore-Sheppard, L. D. (2000), "The Effect of Expanding Medicaid Eligibility on the Distribution of Children's Health Insurance Coverage," *Industrial and Labor Relations Review* 54:59-77.

Shore-Sheppard, L.D., T.C. Buchmueller, and G.A. Jensen (2000), "Medicaid and Crowding Out of Private Insurance: A Re-examination Using Firm Level Data," *Journal of Health Economics* 19:61-91.

Shoven, J.B., J.O. Sundberg, and J.P. Bunker (1989), "The Social Security Cost of Smoking," in: D.A. Wise, ed., *The Economics of Aging*, (University of Chicago Press, Chicago).

Showalter, M.H. (1999), "Firm Behavior in a Market with Addiction: The Case of Cigarettes," *Journal of Health Economics* 18:409-27

Simon, K. I. (2000a), "Adverse Selection in Health Insurance Markets: Evidence from State Small-Group Health Insurance Markets", mimeo, Cornell University.

Simon, K. I. (2000b), "The Effect of State Insurance Regulations on the Price and Availability of Health Benefits in Small Firms", mimeo, Cornell University.

Sing, M., R. Brown, and S.C. Hill (1998), "The Consequences of Paying Medicare Managed Care Plans Their Costs," *Inquiry* 35:210-22.

Silverman, E., and J. Skinner (2000) "Are For-Profit Hospitals Really Different? Medicare Upcoding and Market Structure", mimeo, Dartmouth College.

Sloan, F. A. (2000) "Not-For-Profit Ownership and Hospital Behavior", In: A. Culyer and J. Newhouse, eds., *Handbook of Health Economics, Volume 1B*, (Amsterdam: Elsevier).

Sloan, F. A., and K. W. Adamache (1986), "Taxation and the Growth of Nonwage Compensation," *Public Finance Quarterly* 14:115-37.

Sloan, F.A., and C.J. Conover (1998), "Effects of State Reforms on Health Insurance Coverage of Adults," *Inquiry* 35:280-93.

Spence, A. M. and R. Zeckhauser, (1971), "Insurance, Information, and Individual Action," *American Economic Review, Papers and Proceedings* 61(2): 380-387.

Spence, A. M. (1978), Product Differentiation and Performance in Insurance Markets. *Journal of Public Economics.* 10:427-47.

Steuerle C. E. and J. M. Bakija (1997), *Retooling Social Security for the 21st Century*, (Washington, D.C.: Urban Institute Press).

Sung, H.-Y., T.-W. Hu, and T.-E. Keeler (1994), "Cigarette Taxation and Demand: An Empirical Model", *Contemporary Economic Policy*, 12:91-100.

Swartz, K. and D. W. Garnick (2000), "Adverse Selection and Price Sensitivity When Low-Income People Have Subsidies to Purchase Health Insurance in the Private Market," *Inquiry*, 37: 45-60.

Taylor, A.K. and G.R. Wilensky (1983), The Effect of Tax Policies on Expenditures for Private Health Insurance. In: J. Meyer, ed., Market Reforms in Health Care, (American Enterprise Institute, Washington, D.C.).

Thorpe, K. E., A. Hendricks, D. Garnick, K. Donelan, and J. Newhouse (1992), "Reducing the Number of Uninsured by Subsidizing Employment-Based Health Insurance", *Journal of the American Medical Association*, 19:945-48.

Tirole, J. (1988), *The Theory of Industrial Organization*, (Cambridge, MA: MIT Press).

Tolley, G., D.S. Kenkel, and R.G. Fabian (1994), *Valuing Health for Policy: An Economic Approach* (University of Chicago Press, Chicago).

Triplett, J.E. (2001), "What's Different About health? Human Repair and Car Repaid in National Accounts and in National Health Accounts". In: D. Cutler and E. Berndt, eds., Medical Care Output and Productivity, (Chicago, University of Chicago Press).

Turner, R. W. (1987), Are Taxes Responsible for the Growth in Fringe Benefits?. *National Tax Journal.* 40: 205-20.

United States Congressional Budget Office (1997). *Long-term Budgetary Pressures and Policy Options* (Washington, D.C.: Government Printing Office).

United States Environmental Protection Agency (1992), *Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders.* (Washington, DC: Government Printing Office).

United States Department of Health and Human Services (1994), *Preventing Tobacco Use Among Young People: A Report of the Surgeon General*, (Washington, D.C.: Government Printing Office).

United States Joint Committee on Taxation (1999), *Estimates of Federal Tax Expenditures for the Years 2000-2004*, (Washington, D.C.: Government Printing Office).

United States Physician Payment Review Commission (1996), *Annual Report to Congress*, (Washington, D.C.: Government Printing Office).

Van de Ven, W., and R. P. Ellis (2000), "Risk Adjustment in Competitive Health Plan Markets", in A. Culyer and J. Newhouse, eds., *Handbook of Health Economics, Volume 1*, (Amsterdam: Elsevier).

van de Ven, W. and R. C. J. A. van Vliet (1995), "Consumer Surplus and Adverse Selection in Competitive Health Insurance Markets: An Empirical Study," *Journal of Health Economics*, Vol. 14, No. 2, pp. 149-69.

Viscusi, W.K. (1993), "The Value of Risks to Life and Health," *Journal of Economic Literature* 31:1912-46.

Viscusi, W. K. (1994), *Smoking: Making the Risky Decision* (Oxford University Press, New York).

Viscusi, W. K. (1995), "Cigarette Taxation and the Social Consequences of Smoking," in: J. Poterba, ed., *Tax Policy and the Economy* (MIT Press, Cambridge, MA).

Vroman, S. and G. Anderson (1984), "The Effect of Income Taxation on the Demand for Employer-Provided Health Insurance," *Applied Economics* 16:33-43.

Waters, T. M. and F. A. Sloan (1995), Why Do People Drink? Tests of the Rational Addiction Model. *Applied Economics.* 27:727-36.

Weisbrod, B. (1991), "The Health Care Quadrilemma: An Essay on Technological Change, Insurance, Quality of Care, and Cost Containment", *Journal of Economic Literature*, 29:523-552.

Weissman, J. S. and A.M. Epstein (1994), *Falling Through the Safety Net: Insurance Status and Access to Health Care* (Johns Hopkins University Press, Baltimore).

Weitzman, M.L. (1974), "Prices vs. Quantities," *Review of Economic Studies* 41:477-91.

Welch, W. P. (1986), "The Elasticity of Demand for Health Maintenance Organizations," *Journal of Human Resources* 21:252-66.

Welch, W. P. (1989), "Restructuring the Federal Employees Health Benefits

Program: The Private Sector Option," *Inquiry*, Vol. 26, pp. 321-34.

Wilkinson, R. (1996), *Unhealthy Societies: The Afflictions of Inequality*, (Routledge, New York).

Wilson, C. (1977), "A Model of Insurance Markets with Incomplete Information", *Journal of Economic Theory*. 16:167-207.

Woodbury, S. A. (1983), Substitution Between Wage and Nonwage Benefits.. *American Economic Review*. 73:166-82.

Woodbury, S. A., and D. S. Hamermesh (1992), "Taxes, Fringe Benefits and Faculty," Review of Economics and Statistics 74:287-96.

Wrightson, W., J. Genuardi and S. Stephens, (1987), "Demographic and Utilization Characteristics of HMO Disenrollees," *GHAA Journal*, pp. 23-42.

Yazici, E. Y., and R. Kaestner (1998), "Medicaid Expansions and the Crowding Out of Private Health Insurance," *Inquiry* 37:23-32.

Yelowitz, A. (1995) "The Medicaid Notch, Labor Supply, and Welfare Participation: Evidence from Eligibility Expansions" *The Quarterly Journal of Economics.* 110:909-39.

Yelowitz, A. (1998) "Will Extending Medicaid to Two-Parent Families Encourage Marriage?" *Journal of Human Resources.* 33:833-65.

Zeckhauser, R. (1970), "Medical Insurance: A Case Study of the Tradeoff Between Risk Spreading and Appropriate Incentives," *Journal of Economic Theory* 2: 10-26.

Zuckerman, S. and S. Rajan (1999), "An Alternative Approach to Measuring the Effects of Insurance Market Reforms." Inquiry 36: 44-56

Figure 1: Health and Utility

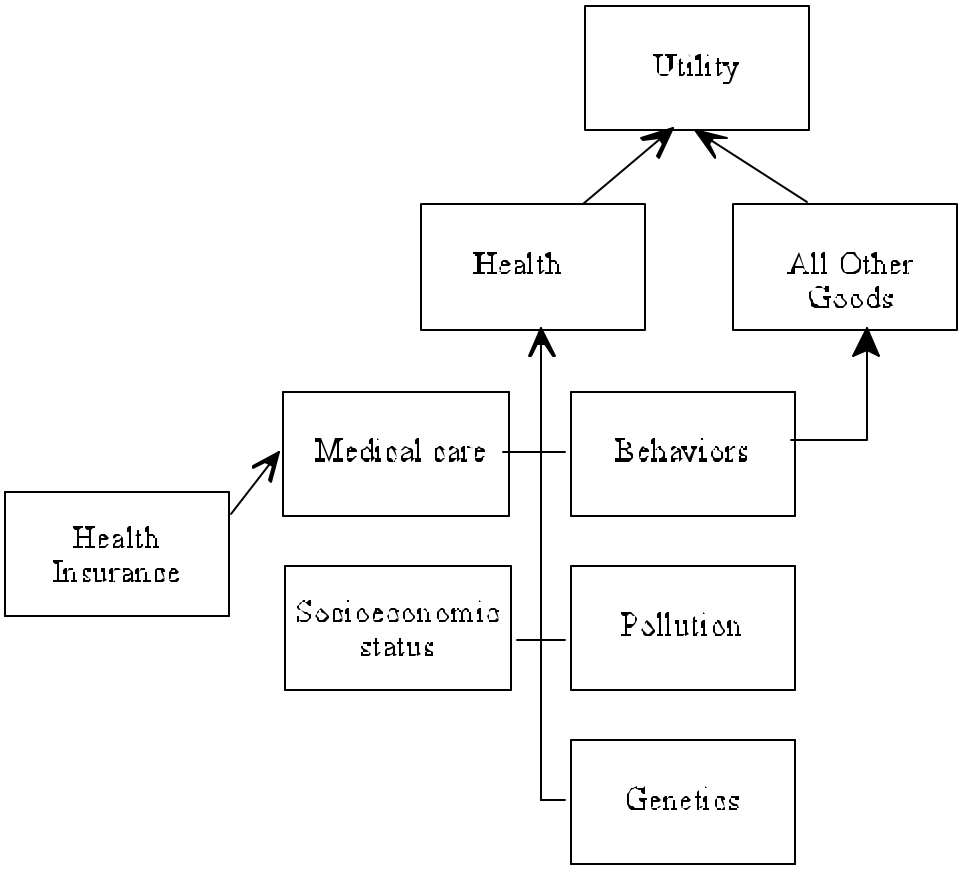


Figure 2: Public Sector Share of Medical Spending, 1995

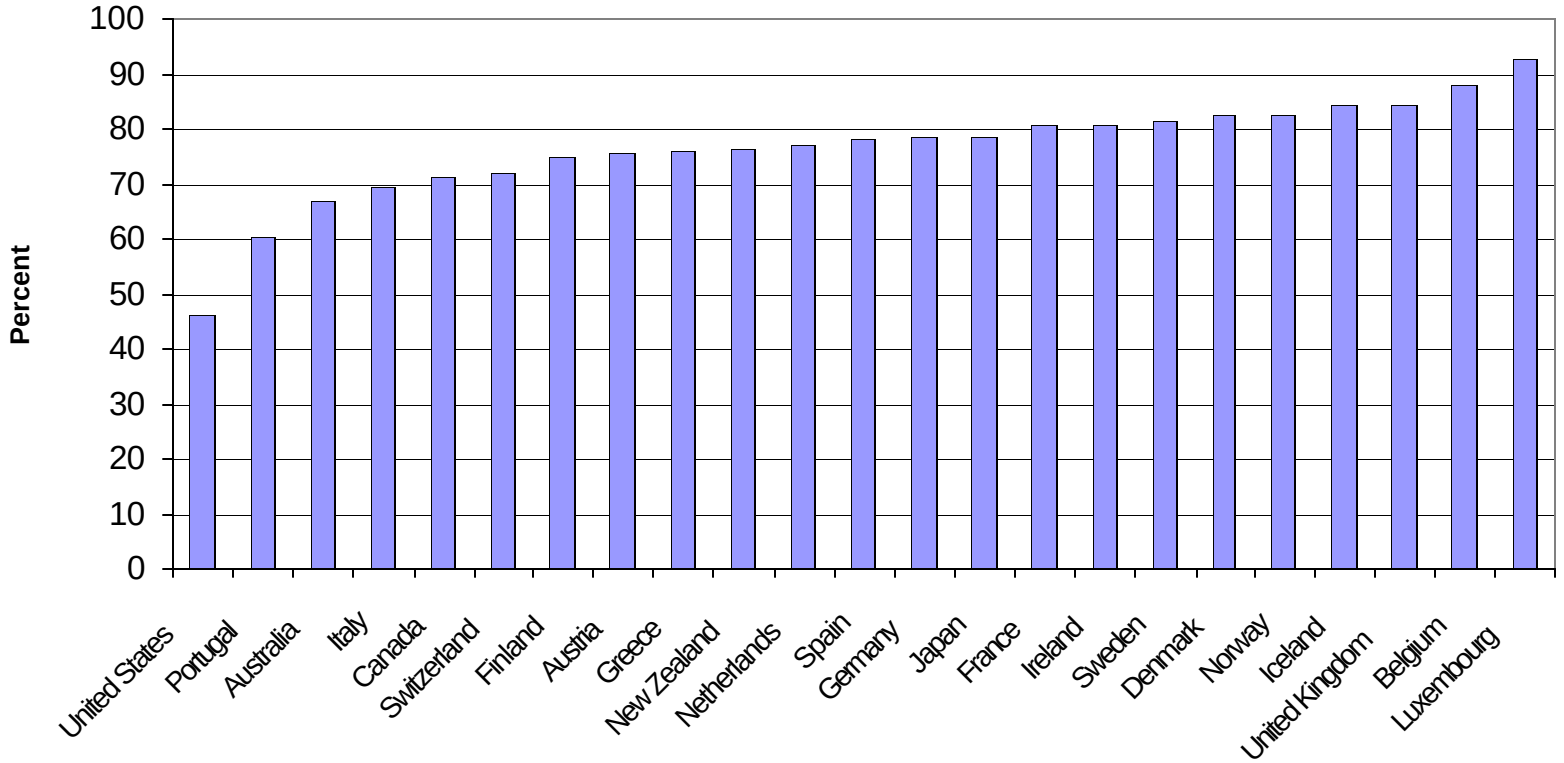
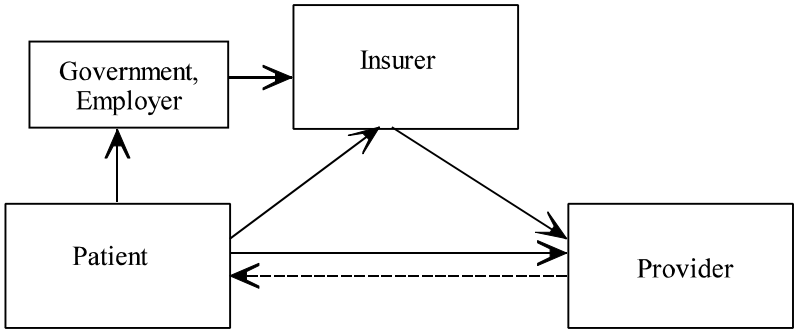


Figure 3: The Medical Care Triad



Solid lines represent money flows; the dashed line represents service flows.

Figure 4: The Welfare Gains from Health Insurance

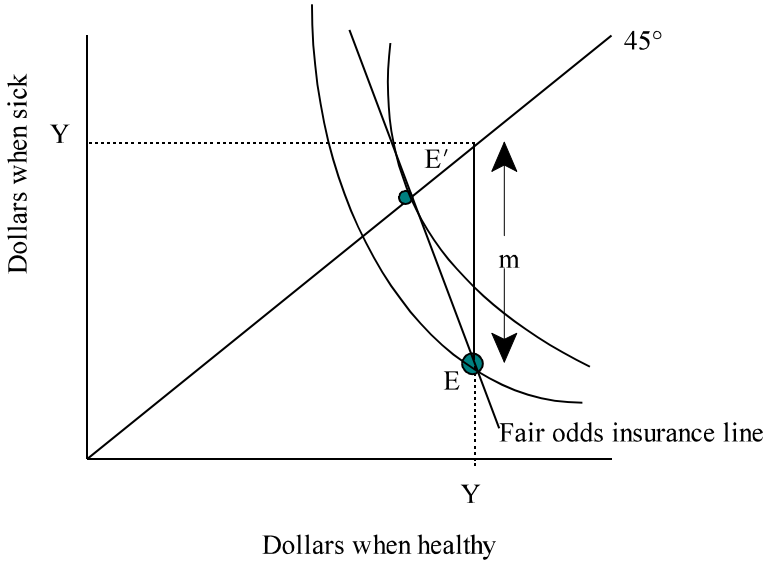


Figure 5: Cost Sharing Under Insurance

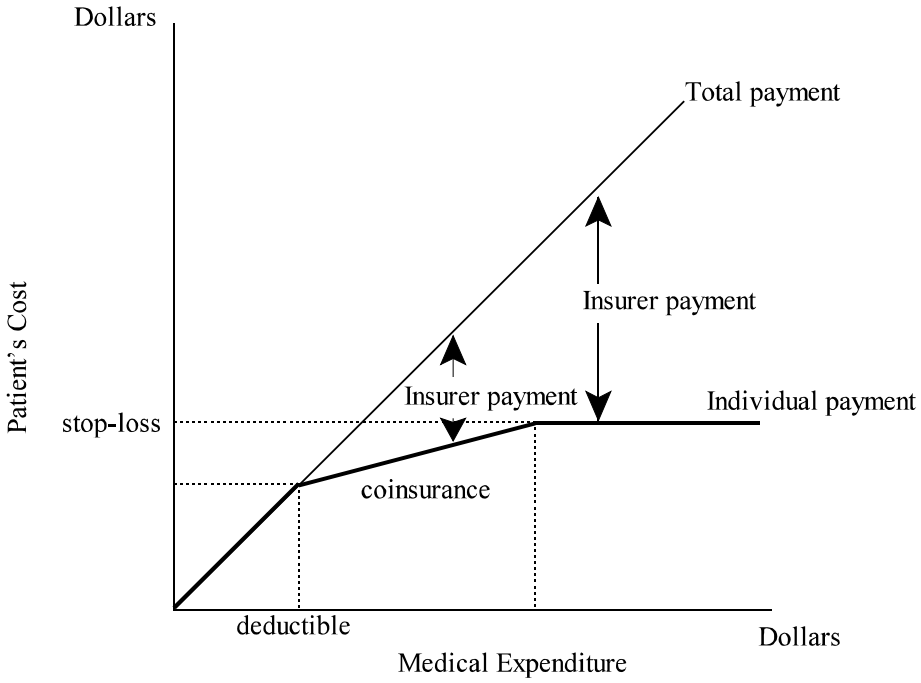
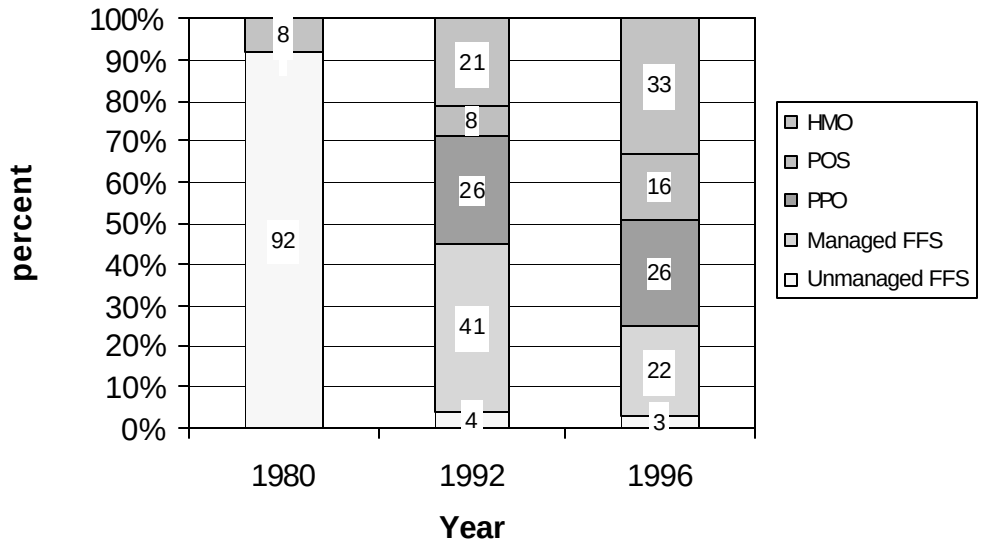


Figure 6: Changes in Health Plan Enrollments



The sample is people with private (employer or individual) insurance
Source: Data are from Lewin-VHI.

Figure 7: Equilibrium with Risk Segmentation

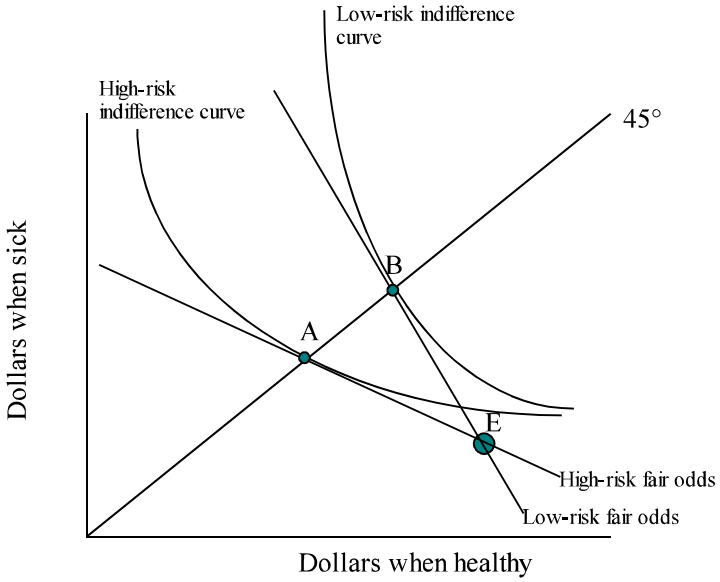
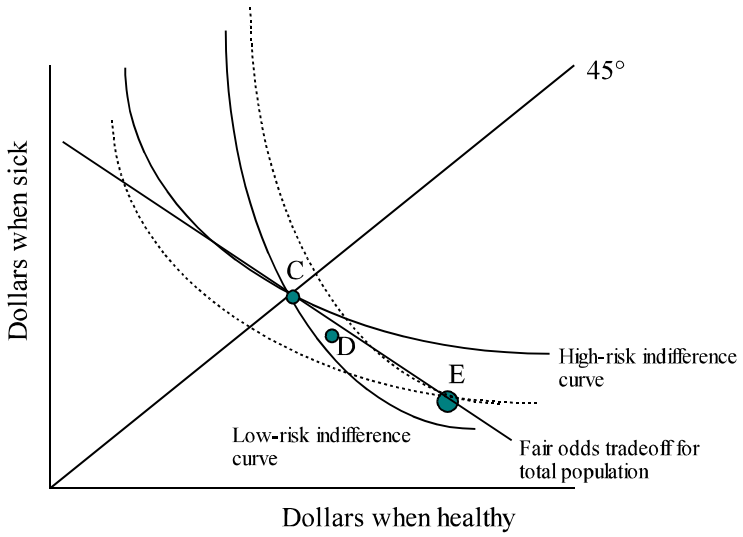


Figure 8: Lack of A Pooling Equilibrium



Dashed lines are indifference curves with no insurance.

Figure 9: The Separating Equilibrium

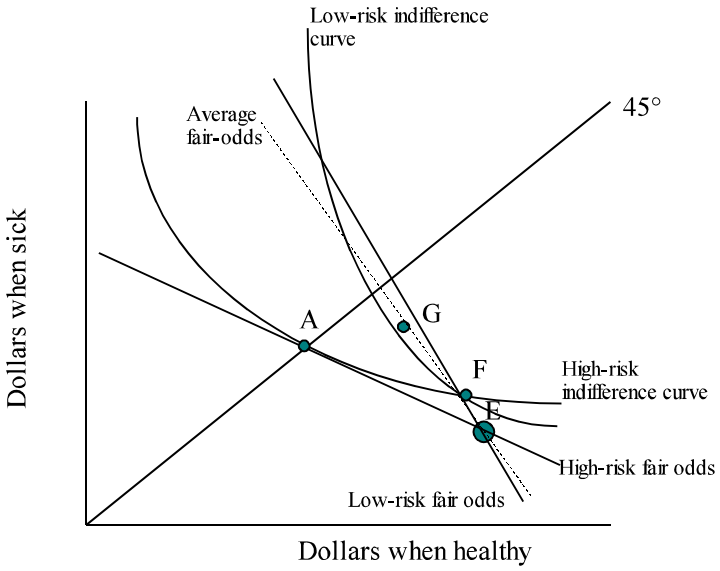


Figure 10: Equilibrium with Multiple Risk Types

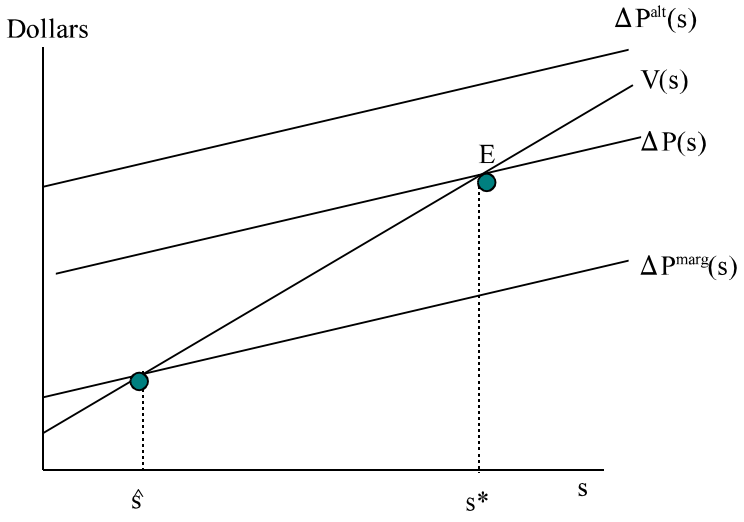


Figure 11: Equilibrium with Subsidies

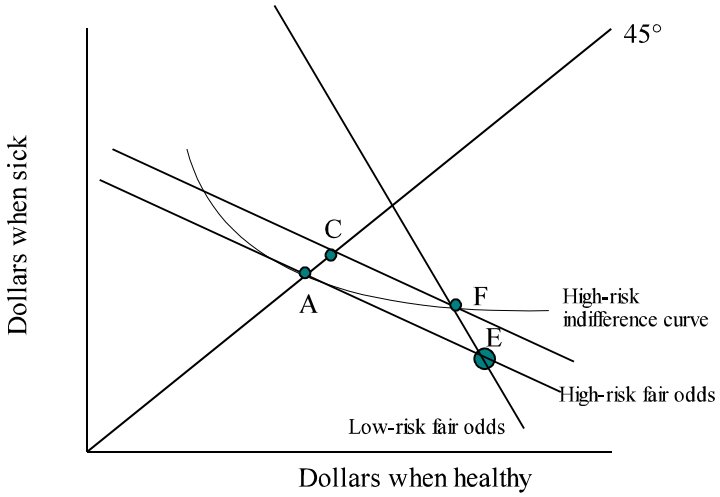


Figure 12: Eligibility for Medicaid, 1999

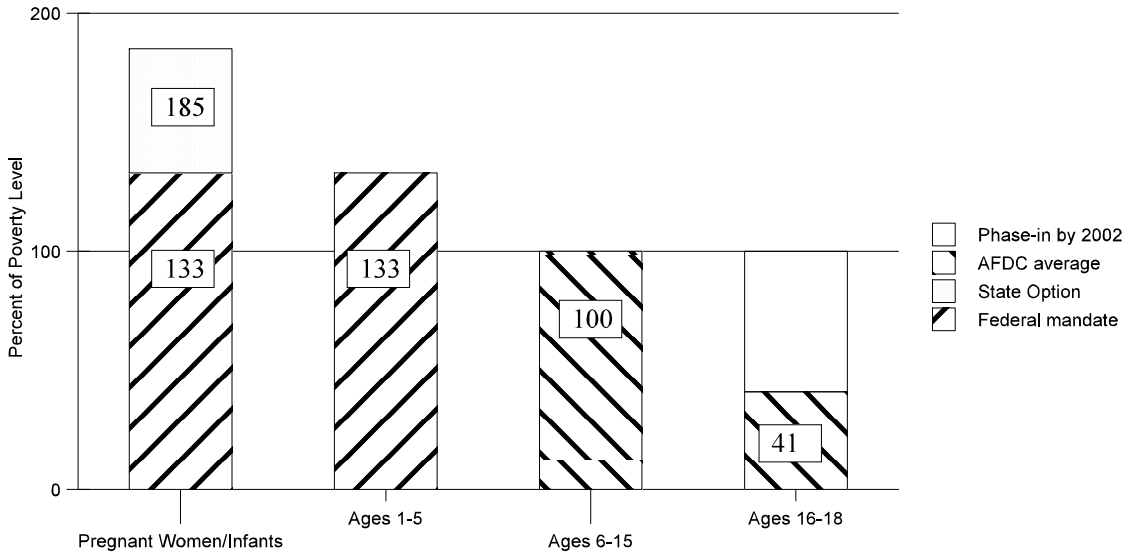


Figure 13: Public Insurance and Crowding Out

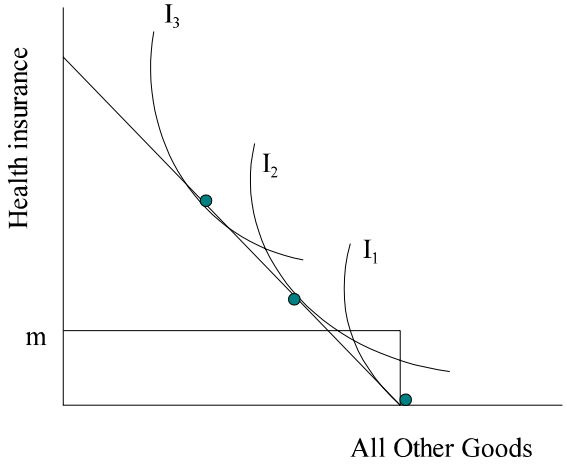
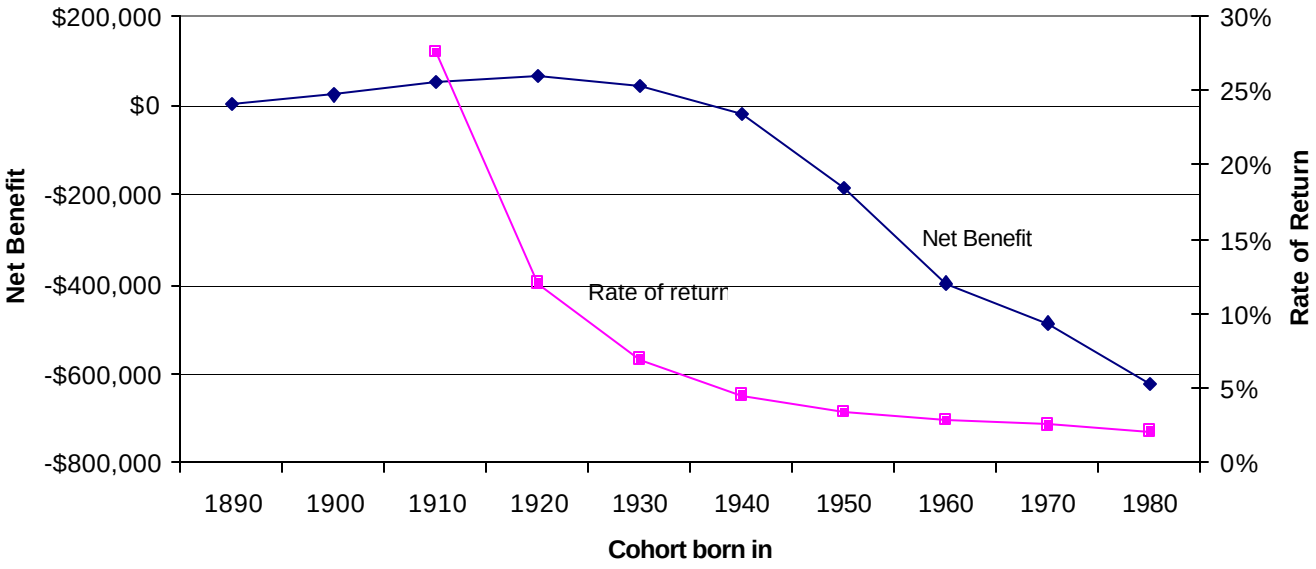


Figure 14: Intergenerational Aspects of Medicare



Source: Cutler and Sheiner (1999).

Table 1: Examples of Different Medical Care Systems

Private insurance, private provision	Public insurance, private provision	Public insurance, public provision
United States	Canada Germany Japan France	United Kingdom Sweden Italy

Source: OECD.

Table 2: Insurance Coverage and Spending in the United States

Program	Eligibility	Share of People	Share of Dollars: For Those People	Share of Dollars: From That Policy
Public				
Medicare	Age 65+; Blind/disabled; people with kidney failure	14%	37%	21%
Medicaid	Non-elderly poor; Blind and disabled; Medicare cost sharing for poor elderly; Nursing home costs for chronically impaired	10	8	9
Other	Veterans; Native Americans; Defense employees	1	1	5
Private				
Employer	Workers and dependents; Retirees	60	49	44
Non-group	Families	3	2	
Uninsured		12	4	21*

Source: 1996 Medical Expenditure Panel Study (MEPS).
The fourth column is total spending for people with each type of insurance. The fifth column is total medical care spending accounted for by that plan.
* Total out-of-pocket medical spending.

Table 3: External Costs of Smoking and Drinking and Optimal Sin Taxes

Paper (date)	Methodology	Costs Included	Results
Smoking			
Manning et al. (1989, 1991)	Construct group of "non-smoking" smokers who are similar to smokers in terms of age, sex, education, drinking habits, etc. but have never smoked. Estimate and compare spending profiles for hypothetical profiles of men and women with and without smoking.	Medical care, sick leave, group life insurance, nursing home, retirement pension, fires, taxes to finance above programs	Estimate of external costs is sensitive to discount rate; range from -$0.91 per pack (0 percent discount rate) to $0.24 per pack (10percent discount rate), in 1986 dollars.
Viscusi (1995)	Similar to Manning et al.; updates many of the estimates using more recent data; accounts for falling tar content of cigarettes.	Medical care, sick leave, group life insurance, nursing home care, retirement pensions, fires, taxes on earnings, environmental tobacco smoke (ETS) related lung cancer and heart disease	Net external costs to society excluding the effects of ETS are -$0.32 to -$0.23; including effect of ETS, estimates rise to as much as $0.41.
Evans, Ringel, and Stech (1999)	Similar to Manning et al.; expand analysis to include additional costs.	ETS-related low birthweight, SIDS deaths, infant mortality and fetal loss; do not do additional analysis but include costs from Manning et al. And Viscusi	The external costs of smoking range from $0.42 to $0.72 per pack in 1994.
SUMMARY			Estimates depend critically on the discount rate assumed and especially on whether the costs of ETS-related deaths due to heart disease, lunch cancer and maternal smoking are considered.

Table 3 (cont)

Paper (date)	Methodology	Costs Included	Results
Drinking			
Pogue and Sgontz (1989)	Develop theoretical model of optimal alcohol taxes; tax depends on relative elasticity of demand for abusers and non-abusers, fraction of alcohol consumed by abusers, and external costs associated with drinking	Use existing estimates of elasticities and external costs to estimate optimal tax.	Depending on assumptions about relative elasticities, alcohol tax (in 1983) ranges from about right to half the optimal level. "Best guess" is that optimal tax is twice actual tax.
Manning et al. (1989, 1991)	Same as for cigarettes (described above).	Medical care, sick leave, group life insurance, nursing home, retirement pension, taxes on earning, motor vehicle accidents, costs associate with the criminal justice system	External costs less sensitive to discount rate than for cigarettes; range from 1.08 to 1.56 per excess ounce of alcohol . Forty percent of consumption is excess ounces, implying an external cost per ounce of about $0.48.
Kenkel (1996)	Estimates elasticities for moderate and heavy drinkers using cross-sectional variation (at state level) in prices. Uses 1985 Health Interview Survey.	Uses estimates from Manning (1989) plus external costs of the risks drunk drivers create for others.	Current alcohol taxes are too low (about half) the optimal tax; stricter drunk driving laws and information provisions would reduce optimal tax.
SUMMARY			Current alcohol tax is well below optimal tax on externality grounds.

Table 4: The Variability of Medical Care Spending

Distribution	Share of Dollars	Average Spending
99+ percent	27.5%	$56,459
95-99 percent	27.7	14,271
90-95 percent	14.0	5,778
70-90 percent	21.2	2,186
<70 percent	9.6	281
Average		$2,060

Source: Data are from the 1996 Medical Expenditure Panel Study (MEPS).

Table 5: The Elasticity of Demand for Insurance

Paper (date)	Data (Years)	Empirical Strategy	Results
Price Elasticity of Demand for Firm Insurance Offering			
Helms, Gauthier, and Campion (1992)	Pilot programs	Analyzes firm responses to pilot program providing subsidies to firms to offer insurance	Finds wide range of responses across sites; elasticities of -0.4 to -1.1.
Thorpe, et al. (1992)	Pilot program in New York	Analyses firm response to 50% subsidy to the price of insurance for small firms.	Actual elasticity of -0.07; estimate elasticity would have been -0.33 if all firms were aware of the program.
Leibowitz and Chernew (1992)	Health Insurance Association of America survey of firms (1989)	Models offering decision as a function of premiums (variation across areas) and tax subsidy for small firms. Average marginal tax rates for firms are imputed based on CPS.	Elasticity of -0.8 for premiums and -2.9 for tax subsidies.
Gentry and Peress (1994)	Occupation Compensation Survey (1988-1992)	Models cross-city differences in the average share of workers offered insurance as a function of the state after-tax price of insurance.	The percentage of workers offered insurance declines by 1.8 percent for a 1 percentage point increase in the price of insurance.
Morrisey, Jensen, and Morlock (1994)	Survey of small firms (1993)	Use small firms' answers to hypothetical questions about whether they would offer insurance at different prices.	Elasticity of offering of -0.92.
Feldman, Dowd, Leitz, and Blewett (1997)	Sample of Minnesota firms (1993)	Imputes premiums to firms not offering coverage. Models offering as a function of premiums in cross-section.	Price elasticities of -3.9 for single coverage and -5.8 for family coverage
Royalty (2000)	CPS of Employee Benefits (1988, 1993)	Models offering as a function of tax subsidy. Uses cross-state variation in marginal tax rates to identify elasticity.	Elasticity of -0.68 across all employers.

Table 5 (continued)

Paper (date)	Data (Years)	Empirical Strategy	Results
Marquis and Long (2001)	Robert Wood Johnson Foundation Employer Health Insurance Survey (firms in 10 states) (1993)	Imputes premiums to firms not offering coverage. Models offering as a function of premiums in cross-section.	40 percent reduction in premiums would inclrease offering by 2 to 3 percentage points.
Finkelstein (forthcoming)	Canadian Social Survey (1991,1994)	Models (supplemental medical) insurance offering as a function of after-tax price. DD comparing change in offering of insurance before and after repeal of tax subsidy in Quebec to change in rest of Canada.	Elasticity of about -0.50.
SUMMARY			-0.14 to -5.8
Price Elasticity of Demand for Insurance Spending			
Long and Scott (1982)	Current Population Reports and Employment and Earnings (1947-1979)	Time series analysis of fringe benefit share of income as a function of marginal tax rates.	A 10 percent increase in marginal tax rates increases the share of compensation devoted to health insurance by 4.1 percent.
Taylor and Wilensky (1983)	National Medical Care Expenditure Survey (1977)	Individual-level analysis of premiums as a function of price (measured as 1 minus the marginal tax rate), income, and demographic controls	Price elasticity is -0.21; income elasticity is 0.02.

Table 5 (continued)

Paper (date)	Data (Years)	Empirical Strategy	Results
Woodbury (1983)	Employee Compensation in the Private Nonfarm Economy (biennial, 1966-1974), Census of Governments (1977)	Estimates demand for non-wage compensation as a function of imputed marginal tax rates; unit of observation is a employee group-establishment-size cell (4 employee groups and 3 establishment sizes). Also estimates similar equations with school district as until of observation.	Elasticity of demand for fringe benefits ranging from -1.2 to -3.0.
Holmer (1984)	Health insurance choices of Federal employees selecting family coverage (1982)	Estimates discrete choice model of health insurance demand as a function of income and marginal tax rate.	Average price elasticity of demand for more generous health insurance of -0.16; income elasticity of 0.01.
Vroman and Anderson (1984)	National Medical Care Expenditure Survey - Employer Health Insurance Cost Survey (1977)	Cross-sectional analysis of health insurance spending per eligible employee; firm is unit of observation. Independent variables are the average effective marginal tax rate, loading factors (based on firm size), wages, and region dummies.	Loading factors are consistently significant and negative. Mixed results for effects of tax rates. In full sample, 10 percent increase in effective tax rate is associated with 7.4 percent increase in employer-based insurance coverage; effects of tax rates are insignificant when sample is split by wages.
Sloan and Adameche (1986)	Survey of Employer Expenditures for Employee Compensation (1968, 1972, 1977); March CPS	Analyzes employer contributions to life-health insurance and private pension plans (per worker and as a fraction of compensation); imputes average marginal tax rate for firm from March CPS.	Tax elasticity of 1.7 for life-health insurance per worker-hour and 0.6 for payments as a fraction of total compensation.

Table 5 (continued)

Paper (date)	Data (Years)	Empirical Strategy	Results
Turner (1987)	NIPA, Statistics of Income (1954-1979)	Time series analysis of share of labor income going to benefits, including health insurance, as a function of average marginal tax rate, controlling for demographics.	Changes in tax rates can explain less than 5 percent of the growth in the share of income going to fringe benefits.
Woodbury and Hamermesh (1992)	Panel of compensation and benefits for faculty at 1477 institutions (1984-85, 1988-89)	Estimate demand for fringe benefits among faculty as a function of average imputed marginal tax rate (with controls); also use instrument capturing variation due to year-state-specific tax rules; also estimate models with school fixed effects.	Significant negative effect of relative price of fringe benefits (due to differential tax treatment) on fringes' share of compensation; estimates are twice as large in absolute value for IV and fixed-effects specifications, compared to OLS.
SUMMARY			-0.2 to -1.0
Price Elasticity of Demand for Insurance Coverage by Individuals			
Marquis and Phelps (1987)	Rand Health Insurance Experiment individual questionaire	Uses individuals responses to questions about willingness to pay for supplementary coverage.	Elasticity of demand for supplementary insurance of -0.6.
Gruber and Poterba (1994)	Current Population Survey (1985-96, 1988-89)	Uses change in tax treatment of insurance for the self-employed to identify elasticity. DD comparing change in coverage among self-employed and employed before and after TRA86.	Elasticity of up to -1.8.
Marquis and Long (1995)	SIPP (1987) and May and March CPS (1988)	Uses cross-area variation in insurance premiums to identify responsiveness of demand for individual policies to price.	Elasticity of -0.3 to -0.4.

Table 5 (continued)

Paper (date)	Data (Years)	Empirical Strategy	Results
Chernew, Frick, and McLaughlin (1997)	Small Business Benefits Survey (1992, 1993)	Estimates probit regressions of demand for health insurance among low-income workers in small firms; price is employee contribution to premium.	Elasticity of demand for employer-provided coverage for those offered coverage (take-up) with respect to employee share of -0.09.
SUMMARY			-0.6 to -1.8
Price Elasticity of Demand for Plan Switching			
Welch (1986)	BLS Level of Benefits Study (1981-82)	Models HMO market share at employer as a function of out-of-pocket premium in cross-section.	Elasticity of demand for HMO (relative to conventional insurance) -0.6 with respect to out-of-pocket premiums.
Feldman, Finch, Dowd, and Cassou (1989)	Survey of employees in 20 Minneapolis firms (1984)	Models individual plan choice as a function of out-of-pocket premiums, plan characteristics, and individual characteristics.	Plan choice is very sensitive to out-of-pocket premiums. A $5 (1984$) increase in out-of-pocket premium can causes a plan to lose 40 percent of its market share.
Dowd and Feldman (1994)	Panel data on employees' health plan choices in 5 Twin Cities employers (1988-1993)	Models plans' market share at an employer as a function of relative out-of-pocket premium. Includes firm, plan, type of coverage, and year fixed effects.	Elasticity of demand for more generous plan with respect to out-of-pocket premium of -7.9 for single coverage.
Buchmueller and Feldstein (1997)	Panel data on UC Berkeley employees' health plan choices (1993-1994)	Compare plan switching among employees experienced increases in out-of-pocket premiums due to employer pricing reform to those whose premiums were unchanged.	Employees facing $10 increase in out-of-pocket premiums were5 times as likely to switch plans as those with constant premiums.

Table 5 (continued)

Paper (date)	Data (Years)	Empirical Strategy	Results
Cutler and Reber (1998)	Panel data on Harvard employees' health plan choices (1994-1996)	Compare plan switching behavior of employees affected by changes in out-of-pocket premiums to those not affected.	Elasticity of demand for generous plan of -0.6 with respect to out-of-pocket premium (elasticity of -2 with respect to total premium).
Royalty and Soloman (1999)	Panel data on Stanford employees' health plan choices supplemented with employee survey (1993-1995)	Multinomial logit model of plan choice as a function of out-of-pocket premium and individual characteristics.	Own-price elasticity of -0.2 to -0.5 (elasticity of -1 to -1.8 with respect to total premium).
SUMMARY			Wide variability, generally greater than elasticity of offering

Table 6: Estimates of the Elasticity of Demand for Medical Care

Paper	Data	Restrictions	Estimation Method	Total Price Elasticity	Visits Price Elasticity	Quality Price Elasticity
Feldstein, P.J. (1964)	1953, 1958 Health Information Foundation and NORC surveys	general care	cross-section estimates of physician visits	-0.19 (physician visits)		
Feldstein, M.S. (1970)	BLS survey; NCHS 1963-64 survey; physician interviews	aggregated physician service data	time-series regression	1.67 (physician services)		
Rosenthal (1970)	1962 sample of New England hospitals	68 of 218 general, short-term hospitals	univariate estimates for short-term care categories	0.19 to -0.70		
Feldstein, M.S. (1971)	AHA survey of hospitals, 1958-1967, NCHS 1963-64 survey	all hospitals, aggregated by state	time-series regression	-0.49 for total bed days	-0.63 for visits to hospital	
Davis and Russell (1972)	1970 guide issue of "Hospitals"	aggregated hospital outpatient care; 48 states' not-for-profit hospitals	cross-sectional estimates	-0.32		
Fuchs and Kramer (1972)	1966 Internal Revenue Service tabulations	physician services, aggregated into 33 states	TSLS: IV's are number of medical schools, ratio of premiums to benefits, and union members per 100 population	-0.10 to -0.36		
Phelps and Newhouse (1972)	Palo Alto Group Health Plan, 1966-68	physician and outpatient ancillary services	natural experiment: introduction of coinsurance	-0.14* OLS, -0.118 Tobit (physician visits)		

Table 6 (continued)

Paper	Data	Restrictions	Estimation Method	Total Price Elasticity	Visits Price Elasticity	Quality Price Elasticity
Scitovsky and Snyder (1972)	Palo Alto Group Health Plan, 1966-68	physician and outpatient ancillary services	natural experiment: introduction of coinsurance	-0.060* (ancillary)	-0.14* (physician visits)	
Phelps (1973)	verified data from 1963 CHAS (University of Chicago) survey	hospitalization and physicians' services	cross-sectional Tobit estimates	not significantly different from zero		
Rosett and Huang (1973)	1960 Survey of Consumer Expenditure	hospitalization and physicians' services	cross-sectional Tobit estimates	-0.35 to -1.5		
Beck (1974)	random sample of poor population of Saskatchewan	physicians' services	natural experiment; introduction of copayments	-0.065*		
Newhouse and Phelps (1974)	1963 CHAS survey	employeds' hospital stays within coverage	cross-sectional OLS (TSLS estimates insignificant)	-0.10 (length of stay)	-0.06 (physician visits)	
Phelps and Newhouse (1974)	insurance plans in US, Canada, and UK	general care, dental care, and prescriptions	arc elasticities across coinsurance ranges	-0.10		
Newhouse and Phelps (1976)	1963 CHAS survey (larger sample than in previous work)	employeds and non-employeds	cross-sectional OLS (TSLS estimates insignificant)	-0.24 (hospital), -0.42 (physician)		
Scitovsky and McCall (1977)	Palo Alto Group Health Plan, 1968-72	physician, outpatient ancillary services	natural experiment: coinsurance increases	-2.56* (ancillary)	-0.29* (physician visits)	
Colle and Grossman (1978)	1971 NORC/CHAS health survey	pediatric care	cross-sectional estimates	-0.11	-0.039	

Table 6 (continued)

Paper	Data	Restrictions	Estimation Method	Total Price Elasticity	Visits Price Elasticity	Quality Price Elasticity
Goldman and Grossman (1978)	1965-66 Mindlin-Densen longitudinal study	pediatric care	hedonic model		-0.060 (compensated -0.032)	-0.088 (compensated -0.085)
McAvinchey and Yannopoulos (1993)	waiting lists from UK's National Health Service	acute hospital care	dynamic intertemporal model	-1.2		
Newhouse et al. (1993)	RAND Health Insurance Experiment	general care	randomized experiment	-0.17 to -0.31 (hospital), -0.17 to -0.22 (outpatient)		
Bhattacharya et al. (1996)	1990 Japanese Ministry of Health and Welfare survey	outpatient visits	Cox proportional hazards model	-0.22		
Cherkin et al. (1989)	Group Health Cooperative of Puget Sound	non-Medicare HMO patients	natural experiment: introduction of copayments	-0.035* (all visits), -0.15* to -0.075* (preventive)		
Eichner (1998)	1990-92 insurance claims from employees and dependents of a Fortune 500 firm	employees aged 25 to 55	one- and two-stage Tobit regressions of out-of-pocket costs	-0.32		
SUMMARY				-0.20	-0.05 to -0.15	

Note: See Cutler and Zeckhauser (2000) for details.

Table 7: Evidence on Biased Enrollment in Health Insurance

Paper	Data	Empirical Methods	Highlights of Results	Selection
Selection Between Managed Care and Indemnity Plans				
Bice (1975)	East Baltimore public housing residents (random sample)	tests of means of health status variables by Medicaid enrollment	poor health and high expected use of medical services is positively correlated with enrollment in prepaid plans; expected costs are reduced	favorable
Scitovsky, McCall and Benham (1978)	Stanford University employees' enrollment and survey data	least-squares regression of plan choice (note dependent variable is binary)	fee-for-service patients are older and more likely to be single or without children	adverse
Eggers (1980)	Group Health Cooperative (GHC) of Puget Sound's Medicare Risk Contract, 1974-76	comparison of usage statistics with control sample from Medicare 20 Percent (Part A) and 5 Percent (Part B) Research Discharge Files	Length of stay 25 percent higher for non-GHC patients; inpatient reimbursements per person are 2.11 times higher outside GHC	adverse
Juba, Lave, and Shaddy (1980)	Carnegie-Mellon University employees' health insurance enrollment and survey, 1976	maximum likelihood logit estimates of determinants of plan choice	lower family self-reported health status results in significantly less chance of selecting HMO enrollment	adverse
McGuire (1981)	Yale University employees' health plan enrollment statistics (random sample)	logistic regression of health plan choice given some plan is chosen	women are less likely to join the prepaid health plan than men, but no significant effect is associated with age	adverse
Jackson-Beeck and Kleinman (1983)	11 employee groups from Minneapolis-St. Paul Blue Cross and Blue Shield, 1978-81	comparison of costs and utilization for HMO enrollees and non-enrollees in period before HMO availability	HMO joiners averaged 53 percent fewer inpatient days before joining than those who chose to stay in FFS	adverse

Table 7 (continued)

Paper	Data	Empirical Methods	Highlights of Results	Selection
Griffith, Baloff, and Spitznagel (1984)	physician visits in the Medical Care Group of St. Louis	nonlinear regression of frequency of visits	high usage rates at managed care plan's initiation eventually fall to lower steady-state levels	ambiguous
Merrill, Jackson and Reuter (1985)	state employees' enrollment and utilization data from Salt Lake City and Tallahassee	tests of means in plan populations and logit regression of health plan choice	HMO joiners are younger, more often male, less likely to use psychiatric services, but have more chronic conditions in their family units	ambiguous
Langwell and Hadley (1989)	1980-81 Medicare Capitation Demonstrations	comparison of HMO enrollees and non-enrollees using two-tailed tests of means; comparison of enrollees and disenrollees using surveys	non-enrollees' reimbursements are 44 percent higher than enrollees in two years before capitation; disenrollees have worse past health	adverse
Brown et al. (1993)	Medicare spending for enrollees who stayed in traditional system versus those who moved into managed care	Comparison of spending in the two years prior to HMO enrollment	enrollees who switch to managed care had 10 percent lower spending than enrollees who stayed in traditional system.	adverse
Rodgers and Smith (1996)	summary of 1992 Mathematica Policy Research study of Medicare enrollees	measure cost differences between elderly customers covered by standard Medicare FFS and capitated HMO care	HMO patients are 5.7 percent costlier	favorable
Altman, Cutler and Zeckhauser (1998)	claims and enrollment data from the Massachusetts Group Insurance Commission (GIC)	age- and sex-adjusted analysis of costs among individuals with different plan choice histories	adverse selection accounts for approximately 2 percent of differences between indemnity and HMO plan costs	adverse
SUMMARY				adverse

Table 7 (continued)

Paper	Data	Empirical Methods	Highlights of Results	Selection
Selection of Reenrollment versus Disenrollment / Uninsurance				
Farley and Monheit (1985)	1977 National Medical Care Expenditure Survey	OLS and 2SLS estimation of health insurance purchases	ambulatory care expenditures have an insignificant impact on health insurance purchases	ambiguous
Wrightson, Genuardi, and Stephens (1987)	disenrollees from seven plans offering different types of managed care	comparison of costs and disenrollment rates for insurees	disenrollees have lower inpatient costs and occupy less risky demographic groups than continuing enrollees	adverse
Long, Settle, and Wrightson (1988)	enrollment patterns of subscribers to three Minneapolis-St. Paul HMOs	probit estimation for chance of insuree disenrolling from each of three HMOs	likelihood of disenrollment rises significantly with increases in relative premium of own plan	adverse
Cardon and Hendel (2001)	National Medical Expenditure Survey	Tobit-style model of insurance choice	individuals who are younger, male, or in "excellent" self-reported health are significantly less likely to become insured	adverse
SUMMARY				adverse
Selection of High-Option Plan within Type of Plan				
Conrad, Grembowksi, and Milgrom (1985)	1980 random sample of claims and eligibility data for dental health insurance by Pennsylvania Blue Shield	2SLS and 3SLS estimation of demand models for premiums and total expenditures	worse self-perceived dental health corresponds to higher valuation of insurance; experience rating does not always lower premiums	adverse
Ellis (1985)	1982-83 employee health plan enrollment and expense records of a large firm	logit estimates of health plan choice	age and worse previous year's health expenses are associated with choice of more generous health coverage for the next year	adverse

Table 7 (continued)

Paper	Data	Empirical Methods	Highlights of Results	Selection
Dowd and Feldman (1985)	survey data from 20 Minneapolis-St. Paul firms	tests of means of characteristics of health plan populations	fee-for-service patients are older and more likely have serious medical conditions or relatives with such conditions	adverse
Luft, Trauner and Maerkis (1985)	California state employees' enrollment and utilization data	comparisons of risk indices across plans and years	patient risk in high option indemnity and fee-for-service plans increases faster than risk in managed care	adverse
Price and Mays (1985)	Federal Employees Health Benefits Program proprietary data	comparison of costs and premiums across plan choices	high option Blue Cross plan undergoes a premium spiral with enrollment cut in half over only three years	adverse
Marquis and Phelps (1987)	Rand Health Insurance Experiment	probit estimation for take-up of supplementary insurance	families in highest expenditure quartile were 42 percent more likely to obtain supplementary insurance than those in lowest quartile	adverse
Ellis (1989)	claims and enrollment data from a large financial services firm	analysis of different plans' member characteristics and expenses	employees in high option plan are 1.8 years older, 20.1 percent more likely to be female, and have 8.6 times the costs of the default plan.	adverse
Feldman, Finch, Dowd and Cassou (1989)	survey of employee health insurance programs at 7 Minneapolis firms	nested logit for plan selection	age varies positively with selection of a (relatively generous) IPA or FFS single-coverage health plan	adverse
Welch (1989)	Towers, Perrin, Forster, and Crosby Inc. study of Federal Employees Health Benefits program	comparison of premiums between high and low option Blue Cross plans for government workers	high-option premium is 79 percent higher than low option	adverse

Table 7 (continued)

Paper	Data	Empirical Methods	Highlights of Results	Selection
Marquis (1992)	plan selection of families in Rand Health Insurance Experiment	comparison of plan choices with age/sex adjustments under various group-rating regimes	73 percent more individuals in high risk quartile choose most generous plan than those in low risk quartile, even with age/sex/experience rating	adverse
Van de Ven and Van Vliet (1995)	survey and claims data from 20,000 families insured by largest Dutch insurer, Zilveren Kreis	regression of risk factors on prediction error of difference in costs between members of high- and low-cost plans.	age- and sex-composition of plans explain 40 percent of error in predicted cost differential between plans	adverse
Buchmueller and Feldstein (1997)	University of California Health Benefits Program enrollment figures	historical analysis of enrollment changes and premium increases	two high-option plans suffered fatal premium spirals in a six-year period; a third was transformed from FFS into POS to prevent a spiral	adverse
Cutler and Reber (1998)	claims and enrollment data from Harvard University	calculation of welfare loss and simulation of long-run effects of changes in health plan prices	adverse selection creates a welfare loss equal to 2 percent of baseline health spending; price responses in long run are triple those in short-run	adverse
Cutler and Zeckhauser (1998)	claims and enrollment data from Harvard University and the Massachusetts Group Insurance Commission (GIC)	analysis of different plans' member characteristics and expenses	employees in GIC's FFS plan spend 28 percent more, are older, and have significantly more births and heart attacks than HMO members	adverse
SUMMARY				adverse

Note: See Cutler and Zeckhauser (2000) for details.

Table 8: Effects of Small-Group and Individual Market Regulation

Paper (date)	Data (Years)	Empirical Strategy	Reforms Examined	Results
Buchmueller and Jensen (1997)	Survey of CA employers, 1993 and 1995; compared to national surveys in same years	Difference-in-difference of insurance coverage between small firms in California versus the rest of the nation	Effect of California law requiring guaranteed issue, rate bands, and pre-existing condition limitations	13 percentage point increase in share of California firms offering insurance
Marsteller, et al. (1998)	March CPS (1989-1995)	State-level analysis of rates of uninsurance, private insurance, and Medicaid coverage. Model includes state and year fixed effects, controls for economic conditions and demographics.	Small group and individual market regulations on issue and rating.	Significant positive effect of small group issue reforms on coverage rates (strongest effects for guaranteed issue); negative effect of rating reforms; these effects are offsetting in states with both reforms. Reforms in individual market were associated with statistically significant decreases in coverage.
Sloan and Conover (1998)	CPS (1989-1994)	Cross-state changes in insurance coverage, public-private mix of coverage, and group-non group coverage for employees in small firms compared to large firms	Mandates; low cost plans; high risk pools; open enrollment; rate bands	Mandates lower coverage by 4 percent. No other policies affect overall insurance coverage; Community rating leads to less private and more public coverage, and more coverage for the old in comparison to the young.
Hing and Jensen (1999)	National Employer Health Insurance Survey (1993)	Cross-sectional analysis of small firms' decision to offer insurance as a function of small group regulations by state.	Rating restrictions, guaranteed renewal, portability, guaranteed issue, preexisting condition waiting period.	Small positive relationship between regulations and percent of firms offering coverage (3-4 percentage points). Small, negative effect for more recent reforms.

Table 8 (continued)

Paper (date)	Data (Years)	Empirical Strategy	Reforms Examined	Results
Jensen and Morrissey (1999)	Health Insurance Association of America's Annual Employer Health Insurance Survey (1989, 1991) and survey conducted by authors (1993, 1995)	Estimates probability of small firms's offering of health insurance as logit. Cross-sectional analysis using 4 years of data; includes region dummies and other controls. Variation in policy variables is at the state level.	Guaranteed issue, guaranteed renewal, portability of coverage, pre-existing conditions, rating restrictions (rating restriction dummies are not included in model due to collinearity).	No significant effect of regulations on probability of offering.
Zuckerman and Rajan (1999)	March CPS (1989-1995)	DD at state-level; analyzes "packages" of reforms that tended to adopted together. Dependent variables are uninsurance rate and rate of private coverage.	Separate analyses of regulation of group market (guaranteed issue, guaranteed renewal, rating restrictions, pre-existing condition restrictins, portability) and individual market (same expect not poratbility).	No statistically significant effect of reforms on coverage in small group market. Individual market reforms have positive, statistically significant effect on uninsurance and negative, statistically significant effect on private insurance rate.
Hall (2000)	Case studies of reforms in a number of states.	Case studies.	Variety of reforms in small group and individual markets.	Reforms have improved access for high-risks at high cost; little effect of small-group reforms on insurance offering; negative effect of individual reforms (guaranteed issue, pure community rating) on coverage.
Simon (1999a)	CPS (1992-1997)	Cross-state changes in insurance coverage for small firms versus large firms	Full reform (guaranteed issue and rate bands); Partial reform (rate bands only); Barebones (requirement to offer basic plan to uninsured)	Full reforms reduced coverage by 1.9 percentage points; Decline of 6.4 percentage points for low risk workers (young, never married men); Statistically insignificant increase for high risk workers (married women while children); No effect of partial reforms or barebones package on coverage

Table 8 (continued)

Paper (date)	Data (Years)	Empirical Strategy	Reforms Examined	Results
Simon (1999b)	Medical Expenditure Panel Survey Insurance Component List Sample (1994) and National Employer Health Insurance Survey (1997)	Cross-state changes in premiums, employee contributions, small firm offering, coverage, and medical underwriting for small versus large firms	Full reform (guaranteed issue and rate bands); Partial reform (rate bands only); Barebones (requirement to offer basic plan to uninsured)	Full reform increased single premiums by 4 percent (marginally significant), increase in employee contribution is 65 percent of total premium increase. No significant effect of full or partial reform on offering. Full reform has statistically significant negative effect on coverage; negative (insignificant) effect on take-up.
Kapur (2000a)	CPS (1991-1999)	Difference-in-differences across states comparing who is hired in small firms with health insurance by measures of expected medical spending.	Strong reform (guaranteed issue, rate bands, portability); Moderate reform (only some of these factors); and no reform	Portability and rating reforms have offsetting effects on employment, with no net change in who is hired in small firms.
Kapur (2000b)	NMES (1987) and MEPS (1996)	Examines employment changes by firm size conditional on being offered health insurance	Regulations making it hard for insurers to deny coverage or exclude pre-existing conditions	Conditions that were a cause for denial in 1987 did not lead to employment distortions but did in 1996, consistent with such conditions being harder to deny.
Swartz and Garnick (2000)	State data on enrollment through IHCP	Trends in enrollment in Blue Cross and IHCP	Establishment of Individual Health Coverage Program in New Jersey	IHCP may have prevented a continued decline in individual coverage.
Buchmueller and DiNardo (forthcoming)	CPS (1987-1996) for NY, PA, and CT	Difference-in-difference comparing small and large firms in New York versus the other states	Implementation of community rating in New York	Large shift to managed care in New York; no change in insurance coverage overall.
SUMMARY				No or small effect of regulations on insurance coverage

Table 9: Insurance Coverage by Income in the Non-Elderly United States Population

	1986			1998		
Income	Private	Public	Uninsured	Private	Public	Uninsured
< Poverty	12%	42%	45%	24%	40%	36%
Poverty - 2 x Poverty	50	12	38	52	17	31
> 2 x Poverty	80	3	17	85	3	12

Source: Data are from the March 1987 and 1999 Current Population Surveys.

Table 10: Effect of Public Health Insurance Programs on Private Coverage

Paper (date)	Data (Years)	Empirical Strategy	Results
Dubay, Norton, and Moon (1995)	American Hospital Association Annual Survey (1987-90); March CPS (1988, 1991); HCFA Area Resource File	Estimate effects of Medicaid expansions on uncompensated care provided by hospitals. (Need to get full article)	Overall, Medicaid expansions reduced uncompensated care by 5.4%; reduced uncompensated care by 28.5% for hospitals with a significant commitment to maternity and infant care.
Cutler and Gruber (1996)	CPS (1988-1993)	Identifies effects of expanding Medicaid eligibility on private and Medicaid coverage of women and children using within-state variation due to differential timing of Medicaid expansions. Includes state and year fixed effects.	Fifty percent of increase in Medicaid coverage (women and children) was offset by reduction in private insurance. Does not appear that employers reduced offering of insurance in response to expansions.
Dubay and Kenney (1996)	CPS (1989, 1993)	Estimetes effect of Medicaid expansions on private coverage for children. Medicaid eligibility is estimated using TRIM2. Compares trends in employer-sponsored private coverage for poor children to trends for men ages 18 to 44.	Crowd out of employer-sponsored coverage is estimated to be 17-26 % of the increase in Medicaid coverage.
Dubay and Kenney (1997)	CPS (1989, 1993)	Estimates effect of Medicaid expansions on private coverage for pregnant women. Insurance coverage, Medicaid eligibility, and pregnancy are simulated using Urban Institute TRIM2. Compares trends in employer-sponsored coverage rates for near-poor pregnant women to those for near-poor men.	Crowd-out is about 45% for near-poor women. Crowd-out of private insurance is smaller for poorer women; overall 30% of increased Medicaid enrollment was offset by declines in private coverage.

Table 10 (continued)

Paper (date)	Data (Years)	Empirical Strategy	Results
Shore-Sheppard (1996)	March CPS (1988-1996)	Compares changes in state-age-income cells with small and large changes in Medicaid eligibility.	Estimates crowd-out between 31 and 57 percent when data through 1996 are included, 15 to 33 percent for 1988-1993.
Yazici and Kaestner (1998)	NLSY (1988, 1992)	Compares take-up of Medicaid and dropping of private insurance among children made eligible for Medicaid between 1988 and 1992 to trends for the always eligible and never eligible in panel data.	Estimates that 14.5% of new Medicaid enrollment due to expansions came from private insurance.
Blumberg, Dubay, and Norton (2000)	SIPP (1990)	Compares transitions from private coverage and uninsurance to Medicaid between 1989 and 1990 for children likely to have been affected by expansions to a comparison group (older children with similar income) in panel data.	Estimate that 23% of movement from private coverage to Medicaid was due to displacement. No evidence that those moving from uninsurance to Medicaid would have otherwise taken up private insurance. Overall estimate of displacement of private insurance is 4% of new Medicaid enrollment.
Rask and Rask (2000)	NMES (1987) and NHIS (1989, 1992)	Uses multinomial logit model of insurance choice (Medicaid, private, uninsured) for different income groups in cross-section to estimate relationship between availability of public hospitals, uncompensated care funds, and Medicaid on insurance choices.	Large negative significant relationship between the presence of a public hospital in the county and private coverage. Also significant negative relationship between Medicaid generosity and uninsured care funds on private coverage rates.

Table 10 (continued)

Paper (date)	Data (Years)	Empirical Strategy	Results
Shore-Sheppard (2000)	March CPS (1988, 1989, 1994, 1995)	Uses variation in impact of Medicaid expansions by region and income decile to identify changes in private coverage, Medicaid coverage and uninsurance. Also uses single men as additional control group. Uses those estimates to form counterfactual distributions of health insurance coverage for children.	Estimates of crowd-out between 7.6 percent and 45.3 percent. Concludes that expansions had and equalizing effect on coverage over the income distribution.
Shore-Sheppard, Buchmueller, and Jensen (2000)	CPS and sample of firms (1989, 1990, 1991, 1993, 1995)	Examines effect of imputed fraction of employees eligible for Medicaid on employer offering of employee and family coverage and employee take-up. Uses CPS to impute fraction of workers in firm who are Medicaid eligible according to states' rules. Includes state and year fixed effects.	No evidence Medicaid expansions effected offering of insurance to employees. Statistically significant negative effect of expansions on offering family coverage. Weak evidence of negative effect of Medicaid expansions on take-up of employer-provided insurance.
SUMMARY			Crowdout ranges from 10 to 50 percent of Medicaid increase

Table 11: Effects of Public Programs on Health

Paper (Date)	Data (Years)	Empirical Strategy/Program Evaluated	Results
Piper, Ray and Griffin (1990)	Vital statistics linked to Medicaid enrollment files for Tennessee (1985-87)	Compare prenatal utilization and birth outcomes for births before and after Medicaid expansion fr pregnant women; some specifications focus on groups most likely to be affected by expansion.	No effect of Medicaid expansion for pregnant women on birth outcomes or initiation of prenatal care for any group. Increase in fraction of Medicaid covered births where enrollment initiated in last 30 days of pregnancy. Both before and after expansion, more than two-thirds enrolled in last 30 days of pregnancy.
Haas, Udvarhelyi, and Epstein (1993)	Massachusetts hospital discharge data for all in-hospital births (1984, 1987)	Compare changes in outcomes of uninsured pregnant women before and after implementation of statewide program for uninsured pregnant women to changes for privately insured and Medicaid patients.	No statistically significant differences in changes in adverse outcomes for uninsured patients, compared to Medicaid and privately insured. The probability of cesarean section rose for uninsured relative to other groups.
Currie and Gruber (1996a)	National Health Interview Survey (1984-1992)	Identifies effects of Medicaid eligibility for children on medical care utilization (eg, doctor visit) and child mortality using within-state variation in eligibility due to differential timing of Medicaid expansions ("simulated instrument").	Medicaid eligibility reduces probability of no doctor's visit in last year by 12.8 percent, increases probability of hospitalization by 14 percent. Ten percentage point increase in fraction eligible for Medicaid reduces child mortality by 0.128 percentage points (3.4% of paseline).
Currie and Gruber (1996b)	Vital Statistics (1979-1992), National Longitudinal Survey of Youth (1979-1990)	Identifies effects of Medicaid expansions for pregnant women on utilization and outcomes.	Thirty percentage point increase in eligibility is associated with 8.5 percent reduction in infant mortality. Early, targeted expansions were more cost-effective than later, broad expansions.

Table 11 (continued)

Paper (Date)	Data (Years)	Empirical Strategy/Program Evaluated	Results
Currie and Gruber (1997)	Vital Statistics (1979-1992)	Same as above. Examines effects of Medicaid eligibility on medical utilization and outcomes for births.	Medicaid eligibility was associated with more intensive treatment and marginal improvements in neonatal mortality. Larger effect on neonatal mortality for mothers living near a hospital with a Neonatal Intensive Care Unit.
Joyce (1999)	Medicaid administrative data linked to birth certificates for birth in New York City (1989, 1991)	Cross-sectional analysis of relationship between birth outcomes and Prenatal Care Assistance Program (PCAP) participation, controlling for demographics. Some specifications stratify month of pregnancy prenatal care was initiated. IV estimates using number of PCAP providers in area as instrument for participation.	PCAP is associated with 20% increase in WIC participation and 1.3 percentage point decrease in rate of low birth-weight. Financial savings are insufficient to offset the cost of the program.
Kaestner, Joyce, and Racine (2001)	National Health Interview Survey (1989,1992), Nationwide Inpatient Sample of ambulatory care sensitive discharges (ACS) (1988-1992)	Examines effect of eligibility on maternal reports of child's health and chronic conditions and bed days (NHIS). Uses state-year-income and age-year interactions to instrument Medicaid eligibility for children aged 2-9. DD: children assigned to treatment and control based on median income of zip code (NIS ACS).	Weak, if any, support for the hypothesis that Medicaid improves health.

Table 11 (continued)

Paper (Date)	Data (Years)	Empirical Strategy/Program Evaluated	Results
Dafny and Gruber (forthcoming)	National Hospital Discharge Survey (1983-1996).	Identifies effects of Medicaid eligibility for children on avoidable hospitalizations using within-state variation in eligibility due to differential timing of Medicaid expansions ("simulated instrument").	Estimates 22 percent decline in avoidable hospitalizations due to expansions. Increase access to hospitalization on newly eligible resulted in net increase of 10 percent in hospitalizations.
SUMMARY			Small improvements in health